

SUPERO[®]

SUPERSERVER 6015C-M3
SUPERSERVER 6015C-MT



USER'S MANUAL

Revision 1.0a

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 6015C-M3/6015C-MT. Installation and maintenance should be performed by experienced technicians only.

The SuperServer 6015C-M3/6015C-MT is a high-end dual processor rackmount server based on the SC813MTQ-520C 1U rackmount server chassis and the Super X7DCL-3/X7DCL-i serverboard. The X7DCL-3/X7DCL-i supports dual Intel® 5200/5100 Series processors in LGA771 sockets.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super X7DCL-3/X7DCL-i serverboard and the SC813MTQ-520C chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 6015C-M3/6015C-MT into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer to this chapter for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 6015C-M3/6015C-MT.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X7DCL-3/X7DCL-i serverboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC813MTQ-520C 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SAS/SATA or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS POST Messages

Appendix B: BIOS POST Codes

Appendix C: Intel HostRAID Setup Guidelines

Appendix D: Software Installation

Appendix E: System Specifications

Notes

Table of Contents

Chapter 1 Introduction

1-1	Overview	1-1
1-2	Serverboard Features	1-2
	Processors	1-2
	Memory	1-2
	Onboard SAS (6015C-M3).....	1-2
	Serial ATA.....	1-2
	PCI Expansion Slots	1-2
	Ethernet Ports	1-3
	Onboard Controllers/Ports	1-3
	Other Features	1-3
1-3	Server Chassis Features	1-5
	System Power	1-5
	SAS/SATA Subsystem.....	1-5
	Control Panel	1-5
	Rear I/O Panel	1-5
	Cooling System	1-5
1-4	Contacting Supermicro.....	1-6

Chapter 2 Server Installation

2-1	Overview	2-1
2-2	Unpacking the System	2-1
2-3	Preparing for Setup	2-1
	Choosing a Setup Location.....	2-1
	Rack Precautions	2-2
	Server Precautions.....	2-2
	Rack Mounting Considerations	2-3
	Ambient Operating Temperature	2-3
	Reduced Airflow	2-3
	Mechanical Loading	2-3
	Circuit Overloading.....	2-3
	Reliable Ground	2-3
2-4	Installing the System into a Rack	2-4
	Identifying the Sections of the Rack Rails	2-4
	Installing the Rear Inner Rails	2-4
	Installing the Rack Rails	2-5
	Installing the Server into the Rack.....	2-6

Installing the Server into a Telco Rack	2-7
2-5 Checking the Serverboard Setup.....	2-8
2-6 Checking the Chassis Setup.....	2-10
Chapter 3 System Interface	
3-1 Overview	3-1
3-2 Control Panel Buttons	3-1
Reset	3-1
Power	3-1
3-3 Control Panel LEDs	3-2
Overheat/Fan Fail	3-2
NIC2	3-2
NIC1	3-2
HDD.....	3-2
Power	3-3
3-4 Drive Carrier LEDs	3-3
SAS Drives (6015C-M3)	3-3
SATA Drives (6015C-MT).....	3-3
Chapter 4 System Safety	
4-2 General Safety Precautions	4-2
4-3 ESD Precautions.....	4-3
4-4 Operating Precautions	4-4
Chapter 5 Advanced Serverboard Setup	
5-1 Handling the Serverboard	5-1
Precautions	5-1
Unpacking	5-2
5-2 Serverboard Installation	5-2
5-3 Connecting Cables.....	5-3
Connecting Data Cables	5-3
Connecting Power Cables	5-3
Connecting the Control Panel.....	5-4
5-4 I/O Ports	5-4
5-5 Processor and Heatsink Installation.....	5-5
5-6 Installing Memory	5-8
5-7 Adding PCI Cards	5-9
5-8 Serverboard Details	5-10
Motherboard Layout	5-10
X7DCL-3/X7DCL-i Quick Reference	5-11
5-9 Connector Definitions	5-12

	ATX Power Connector.....	5-12
	Processor Power Connector	5-12
	PW_ON Connector.....	5-12
	Reset Connector	5-12
	Overheat LED (OH).....	5-13
	NIC2 (LAN2) LED.....	5-13
	NIC1 (LAN1) LED.....	5-13
	HDD LED.....	5-13
	Power On LED	5-13
	NMI Button	5-14
	Fan Headers.....	5-14
	ATX PS/2 Keyboard and PS/2 Mouse Ports.....	5-14
	Chassis Intrusion.....	5-14
	LAN1/2 (Ethernet Ports).....	5-14
	Universal Serial Bus (USB).....	5-15
	Wake-On-LAN	5-15
	Wake-On-Ring	5-15
	Power Supply Fail Detect.....	5-16
	Alarm Reset.....	5-16
	PWR I ² C	5-16
	BPI ² C	5-16
	Serial Ports.....	5-17
	SGPIO Headers	5-17
	Power LED/Speaker.....	5-17
	Keylock.....	5-17
5-10	Jumper Settings	5-18
	Explanation of Jumpers	5-18
	CMOS Clear	5-18
	VGA Enable/Disable.....	5-18
	LAN1/LAN2 Enable/Disable	5-19
	SAS Enable/Disable	5-19
	SAS RAID Select	5-19
	Watch Dog.....	5-19
	I ² C Bus to PCI/PCI-Exp. Slots	5-20
5-11	Onboard Indicators.....	5-20
	LAN1/LAN2 LEDs.....	5-20
	Onboard Power LED (LED3).....	5-20
	System Status LED (LED4).....	5-20
	CPU_VRM Overheat LED Indicators (LED5/LED6).....	5-21

5-12	Floppy and IDE Drive Connections.....	5-21
	Floppy Connector	5-21
	IDE Connector	5-22
	SAS Ports	5-23
	SATA Ports	5-23

Chapter 6 Advanced Chassis Setup

6-1	Static-Sensitive Devices.....	6-1
	Precautions	6-1
	Unpacking	6-1
6-2	Control Panel	6-2
6-3	System Fans	6-3
	System Fan Failure	6-3
6-4	Drive Bay Installation/Removal	6-3
	Removing the Front Bezel	6-3
	SAS/SATA Drive Installation.....	6-4
	Accessing the Drive Bays	6-4
	DVD-ROM Drive Installation	6-6
6-5	Power Supply	6-7
	Power Supply Failure	6-7
	Replacing the Power Supply.....	6-7

Chapter 7 BIOS

7-1	Introduction.....	7-1
7-2	Running Setup	7-2
7-3	Main BIOS Setup	7-2
7-4	Advanced Setup.....	7-7
7-5	Security	7-20
7-6	Boot	7-21
7-7	Exit	7-22

Appendix A BIOS POST Messages

Appendix B BIOS POST Codes

Appendix C Intel HostRAID Setup Guidelines

Appendix D Software Installation

Appendix E System Specifications

Chapter 1

Introduction

1-1 Overview

The SuperServer 6015C-M3/6015C-MT is a dual processor server comprised of two main subsystems: the SC813MTQ-520C 1U rackmount chassis and the X7DCL-3/X7DCL-i serverboard. Please refer to our web site for information on operating systems that have been certified for use with the 6015C-M3/6015C-MT (www.supermicro.com).

In addition to the serverboard and chassis, various hardware components may have been included with the 6015C-M3/6015C-MT, as listed below.

- Two CPU heatsinks (SNK-P0017)
- One (1) slim DVD-ROM drive [DVM-PNSC-824(B)]
- SAS/SATA Accessories:
 - Four (4) SAS/SATA hard drive carriers (CSE-PT-39(B))
 - One (1) internal SAS/SATA backplane (BPN-SAS-815TQ)
 - One (1) SAS/SATA cable set (CBL-0186L)
- One (1) PCI-E x8 riser card (CSE-RR1U-E8)
- One (1) front side USB/COM port tray [(CSE-PT-40(B)]
- Four (4) 4-cm high-performance fans (FAN-0061)
- One (1) air shroud for 1U chassis (MCP-310-00029-01)
- Rackmount hardware with screws (CSE-PT52):
 - Two (2) rack rail assemblies
 - Six (6) brackets for mounting the rack rails in a rack/telco rack
- One (1) CD containing drivers and utilities
- SuperServer 6015C-M3/6015C-MT User's Manual

Note: "B" indicates part is available in black.

1-2 Serverboard Features

At the heart of the SuperServer 6015C-M3/6015C-MT lies the X7DCL-3/X7DCL-i, a single processor serverboard based on Intel's 5100 chipset and designed to provide maximum performance. Below are the main features of the X7DCL-3/X7DCL-i.

Processors

The X7DCL-3/X7DCL-i supports dual Intel® 5400, 5300, 5200 or 5100 Series processors in LGA771 sockets. Please refer to our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X7DCL-3/X7DCL-i has six 240-pin DIMM sockets that can support up to 48 GB of registered ECC DDR2-667/533 SDRAM. Memory must be installed in an interleaved (dual-channel) configuration. All memory modules used to populate the system should be the same size, type and speed. See Chapter 5 for details.

Onboard SAS (6015C-M3)

An onboard LSI 1068E SAS controller is integrated into the X7DCL-3. The hot-swappable SAS drives are connected to a backplane that provides power, bus termination and configuration settings.

Note: The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the SAS drives. RAID 0, 1, 5 and 10 are supported.

Serial ATA

The South Bridge (ICH9R) of the 5100 chipset includes a Serial ATA controller. The hot-swappable SATA drives are connected to a backplane that provides power, bus termination and configuration settings.

Note: The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the SAS drives. RAID 0, 1, and 10 are supported.

PCI Expansion Slots

The X7DCL-3/X7DCL-i has two PCI-Express x8 slots, one PCI-Express x4 slot (in a x8 slot) and three 32-bit, 33 MHz (5V) PCI slots. In the 6015C-M3/6015C-MT server configuration, a PCI-E riser card (CSE-RR1U-E8) has been installed to support a single PCI-Express add-on card.

Ethernet Ports

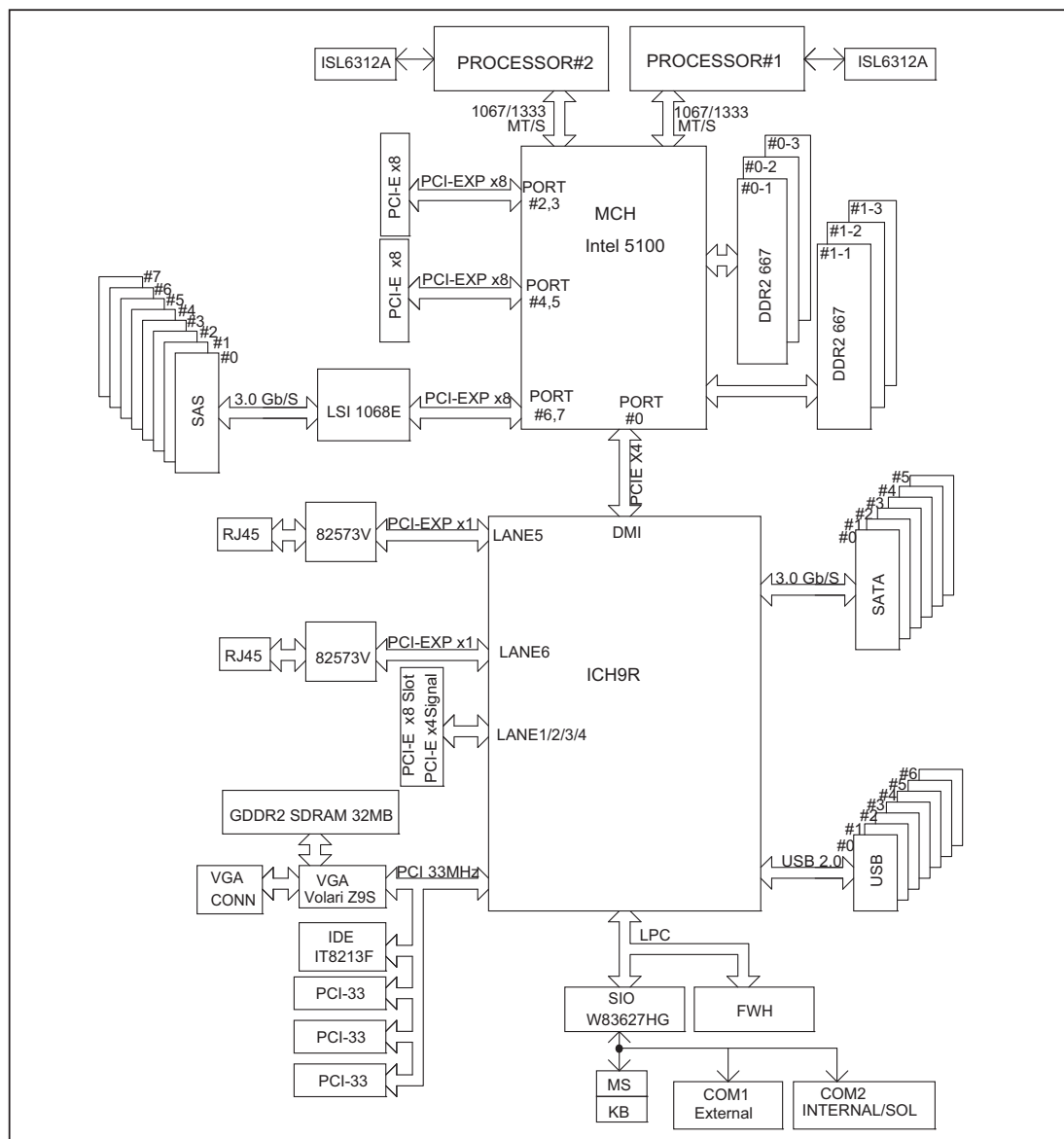
The X7DCL-3/X7DCL-i has two network controllers integrated into the chipset to support two Gigabit LAN ports (100/1000Base-T/1000BaseTX, RJ45 output).

Onboard Controllers/Ports

An onboard IDE controller supports Ultra ATA 100 hard drives or ATAPI devices. Onboard I/O backpanel ports include one COM port, a VGA port, two USB ports, PS/2 mouse and keyboard ports and two Gigabit LAN (NIC) ports.

Other Features

Other onboard features that promote system health include voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.



**Figure 1-1. Intel 5100 Chipset:
System Block Diagram**

Note: This is a general block diagram. Please see Chapter 5 for details.

1-3 Server Chassis Features

The following is a general outline of the main features of the SC813MTQ-520C chassis. Details on the chassis can be found in Chapter 6.

System Power

When configured as a SuperServer 6015C-M3/6015C-MT, the SC813MTQ-520C chassis includes a single 520W power supply.

SAS/SATA Subsystem

For the 6015C-M3, the SC813MTQ-520C chassis was designed to support four SAS hard drives, which are hot-swappable units. For the 6015C-MT, the SC813MTQ-520C chassis was designed to support four SATA hard drives, which are also hot-swappable units. **Note:** The operating system you use must have RAID support to enable the hot-swap capability of the SAS/SATA drives.

Control Panel

The SC813MTQ-520C's control panel provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity and system overheat conditions. The control panel also includes a main power button and a system reset button. The front of the SC813MTQ-520C also includes a COM port and two USB serial ports for easy access.

Rear I/O Panel

The SC813MTQ-520C is a 1U rackmount chassis. Its I/O panel provides a slot for one full-height, half-length PCI expansion card, one COM port (another is internal), two USB ports, a VGA port, PS/2 mouse and keyboard ports and two Gb Ethernet ports. See Chapter 6 for details.

Cooling System

The SC813MTQ-520C chassis has an innovative cooling design that features four high-performance 4-cm fans. Each of these fans plug into a chassis fan header on the serverboard. An air shroud channels the airflow generated by the fans to efficiently cool the processor area of the system.

A fan speed control setting in BIOS allows fan speed to be determined by system temperature [the recommended setting is 3-pin (Server)].

1-4 Contacting Supermicro

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Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 6015C-M3/6015C-MT up and running. Following the steps in the order given should enable you to have the system operational within a minimal amount of time. This quick setup assumes that your 6015C-M3/6015C-MT system has come to you with the processor and memory preinstalled. If your system is not already fully integrated with a serverboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the SuperServer 6015C-M3/6015C-MT was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 6015C-M3/6015C-MT. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the SuperServer 6015C-M3/6015C-MT was shipped in should include two sets of rail assemblies, six rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimal amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).
- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.



Warnings and Precautions!



Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SATA drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.) for sufficient airflow and ease in servicing.

2-4 Installing the System into a Rack

This section provides information on installing the SuperServer 6015C-M3/6015C-MT into a rack unit with the rack rails provided. If the server has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

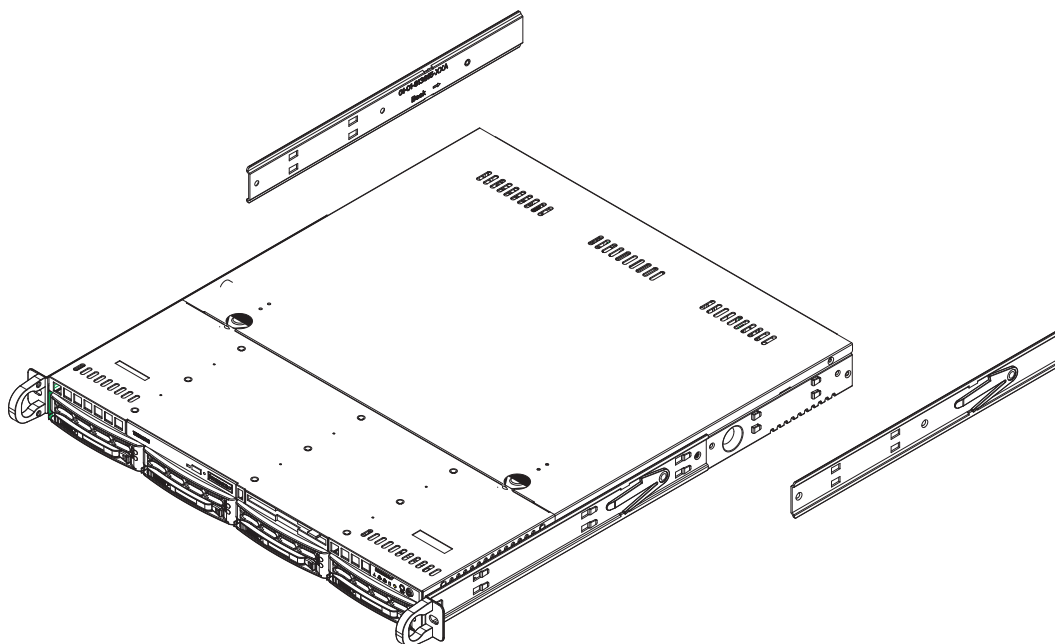
You may have received rack rail hardware with the SuperServer 6015C-M3/6015C-MT. (Two front inner rails should already be attached to the chassis.) This hardware consists of two rear inner rails that secure to the chassis, one on each side just behind the preinstalled front inner rails. Note that these two rails are left/right specific.

Installing the Rear Inner Rails

First, locate the right rear inner rail (the rail that will be used on the right side of the chassis when you face the front of the chassis). Align the two square holes on the rail against the hooks on the right side of the chassis. Securely attach the rail to the chassis with M4 flat head screws. Repeat these steps to install the left rear inner rail to the left side of the chassis (see Figure 2-1). You will also need to attach the rail brackets when installing into a telco rack.

Locking Tabs: Both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

Figure 2-1. Installing Rear Inner Chassis Rails



Installing the Rack Rails

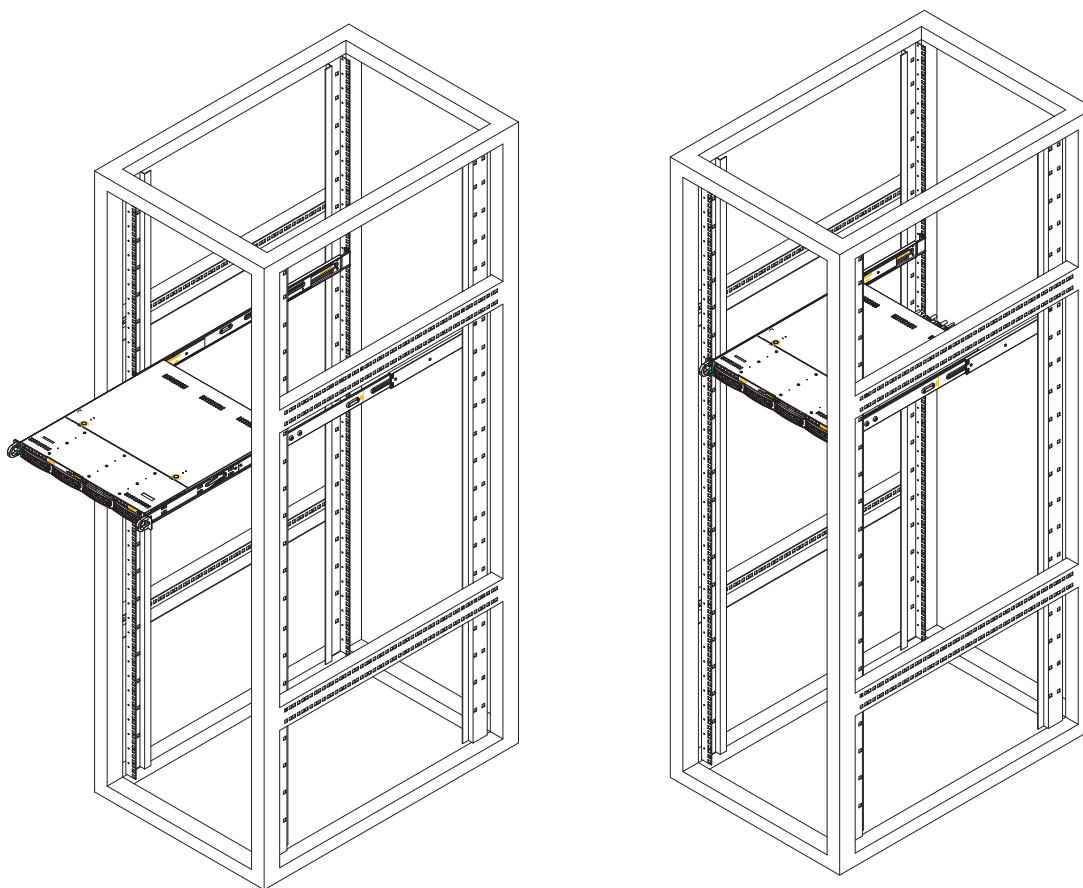
Determine where you want to place the SuperServer 6015C-M3/6015C-MT in the rack (see Rack and Server Precautions in Section 2-3). Position the chassis rail guides at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the assembly securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making sure that both are at the exact same height and with the rail guides facing inward.

Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-2.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack.

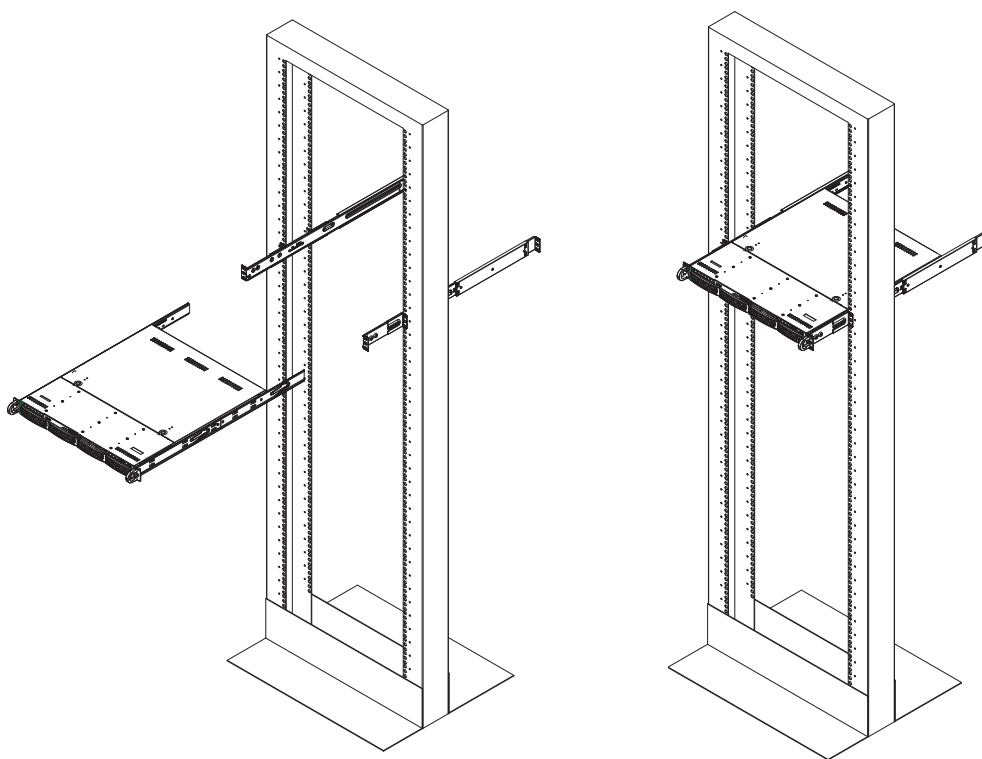
**Figure 2-2. Installing the Server into a Rack
(with optional front bezel shown)**



Installing the Server into a Telco Rack

To install the SuperServer 6015C-M3/6015C-MT into a Telco type rack, use two L-shaped brackets on either side of the chassis (four total). First, determine how far the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

**Figure 2-3. Installing the Server into a Telco Rack
(with optional front bezel shown)**



2-5 Checking the Serverboard Setup

After you install the 6015C-M3/6015C-MT in the rack, you will need to open the unit to make sure the serverboard is properly installed and all the connections have been made.

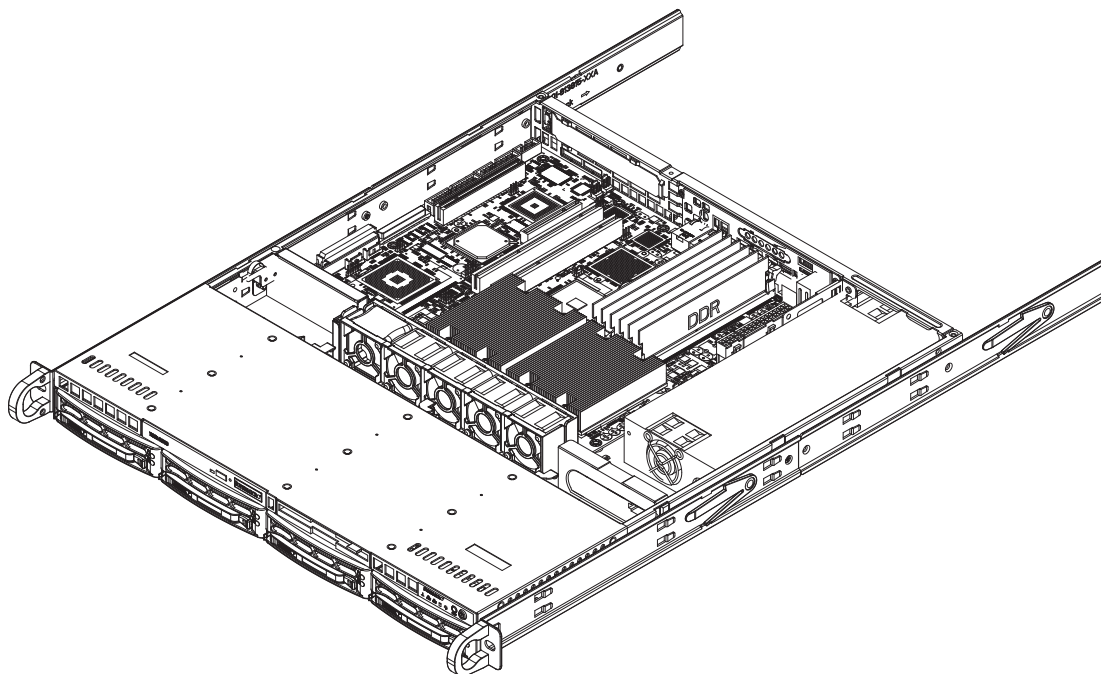
Accessing the inside of the System

1. First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click").
2. Depress the two buttons on the top of the chassis to release the top cover. There is a large rectangular recess in the middle front of the top cover to help you push the cover away from you until it stops.
3. Lift the top cover from the chassis to gain full access to the inside of the server.

Checking the Components and Setup

1. You may have one or more processors already installed into the system board. Each processor should have its own heatsink attached. See Chapter 5 for instructions on processor installation.
2. Your 6015C-M3/6015C-MT server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.
3. If desired, you can install an add-on card to the system. See Chapter 5 for details on installing a PCI add-on card.
4. Make sure all power and data cables are properly connected and not blocking the airflow. Also make sure that no cables are positioned in front of the fans. See Chapter 5 for details on cable connections.

Figure 2-4.
Accessing the Inside of the SuperServer 6015C-M3/6015C-MT



2-6 Checking the Chassis Setup

Next, you should check to make sure the peripheral drives and the SAS/SATA drives and SAS/SATA backplane have been properly installed and all essential connections have been made.

Checking the Drives

1. All drives can be accessed from the front of the server. For servicing the DVD-ROM drive, you will need to remove the top chassis cover. The SAS/SATA disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.
2. Refer to Chapter 6 if you need to reinstall a DVD-ROM drive to the system.
3. Depending upon your system's configuration, your system may have one or more SAS/SATA drives already installed. If you need to install SAS/SATA drives, please refer to the appropriate section in Chapter 6.

Checking the Airflow

1. Airflow is provided by four high-performance 4-cm input fans. The system component layout was carefully designed to promote sufficient airflow through the small 1U rackmount space.
2. Also note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

Providing Power

1. Plug the power cord from the power supply unit into a high-quality power strip that offers protection from electrical noise and power surges.
2. It is recommended that you use an uninterruptible power supply (UPS).
3. Press the power button on the front of the chassis.

Chapter 3

System Interface

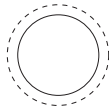
3-1 Overview

There are several LEDs on the control panel as well as others on the SAS/SATA drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel and an on/off switch on the power supply. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

3-2 Control Panel Buttons

There are two push-buttons located on the front of the chassis. These are (in order from left to right) a reset button and a power on/off button.

RESET



Reset

The reset button reboots the system.



Power

This is the main power button, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC813MTQ-520C chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.



Overheat/Fan Fail

When this LED flashes, it indicates a fan failure. When on continuously it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the indicated condition exists.



NIC2

Indicates network activity on LAN2 when flashing .



NIC1

Indicates network activity on LAN1 when flashing.



HDD

Channel activity for all HDDs. This light indicates DVD-ROM and SAS/SATA drive activity on the 6015C-M3/6015C-MT when flashing.



Power

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 Drive Carrier LEDs

SAS Drives (6015C-M3)

Each SAS drive carrier has two LEDs:

- **Green:** When illuminated, the green LED on the front of the SAS drive carrier indicates drive activity. A connection to the backplane enables this LED to blink on and off when that particular drive is being accessed.
- **Red:** The SES2 compliant backplane activates the red LED to indicate a drive failure. If one of the SAS drives fail, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed SAS drives.

SATA Drives (6015C-MT)

Each SATA drive carrier has two LEDs.

- **Green:** When illuminated, the green LED on the front of the SATA drive carrier indicates drive activity. A connection to the SATA backplane enables this LED to blink on and off when that particular drive is being accessed.
- **Red:** The red LED indicates two states. When blinking, it indicates the drive is rebuilding. When solid, it indicates a drive failure. If a SATA drive fails, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed SATA drives.

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions



Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 6015C-M3/6015C-MT from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and floppy drive. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- CD-ROM Laser: **CAUTION** - this server may have come equipped with a CD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.
- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

4-2 General Safety Precautions



Follow these rules to ensure general safety:

- Keep the area around the 6015C-M3/6015C-MT clean and free of clutter.
- The 6015C-M3/6015C-MT weighs approximately 38 lbs (~17.3 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.
- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3 ESD Precautions



Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

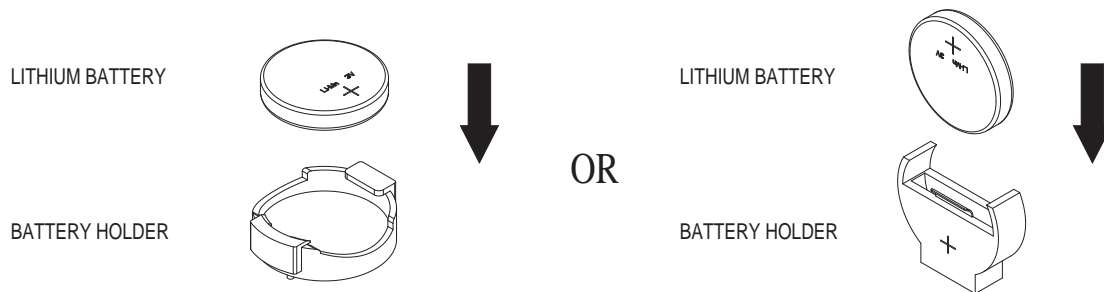
- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

4-4 Operating Precautions



Care must be taken to assure that the chassis cover is in place when the 6015C-M3/6015C-MT is operating to assure proper cooling. Out of warranty damage to the 6015C-M3/6015C-MT system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install the X7DCL-3/X7DCL-i serverboard into the SC813MTQ-520C chassis, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the serverboard to better cool and protect the system.

5-1 Handling the Serverboard

Electrostatic discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). To prevent the X7DCL-3/X7DCL-i serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

Precautions

- Use a grounded wrist strap designed to prevent electrostatic discharge (ESD).
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Unpacking

The serverboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

5-2 Serverboard Installation

This section explains the first step of physically mounting the X7DCL-3/X7DCL-i into the SC813MTQ-520C chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the serverboard, follow the procedure in reverse order.

Installing to the Chassis

1. Depress the two release buttons are located on the top cover of the chassis while pushing the cover away from you until it stops.
2. You can then lift the top cover from the chassis to gain full access to the inside of the server. (If already installed in a rack, you must first release the retention screws that secure the unit to the rack.
3. Grasp the two handles on either side and pull the unit straight out until the rails lock into place.) See Figure 2-5.
4. Make sure that the I/O ports on the serverboard align properly with their respective holes in the I/O shield at the back of the chassis.
5. Carefully mount the serverboard to the serverboard tray by aligning the board holes with the raised metal standoffs that are visible in the chassis.
6. Insert screws into all the mounting holes on your serverboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads).

Note: Metal screws provide an electrical contact to the serverboard ground to provide a continuous ground for the system.

5-3 Connecting Cables

Now that the serverboard is installed, the next step is to connect the cables to the board. These include the data cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations).

The following data cables (with their locations noted) should be connected. (See the layout on page 5-9 for connector locations.)

- DVD-ROM cable (IDE#1)
- Front side USB port cables (JUSB1)
- Front side COM port cable (COM2)

6015C-M3:

- SAS drive cables (SAS0, SAS1, SAS2, SAS3)
- SGPIO cables (3-SGPIO0)

6015C-MT

- SATA drive cables (SATA0, SATA1, SATA2, SATA3)
- SGPIO cables (T-SGPIO0)
- Control Panel cable (JF1)

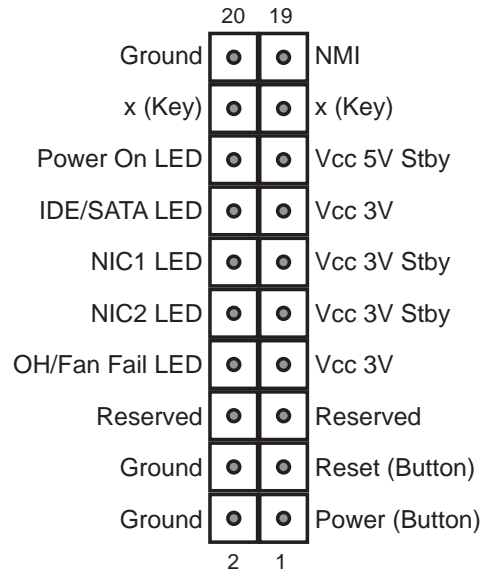
Connecting Power Cables

The X7DCL-3/X7DCL-i has a 24-pin primary power supply connector (JPW1) for connection to the ATX power supply. In addition, there is an 8-pin processor power connector (JPW3) that also must be connected to your power supply. See Section 5-9 for power connector pin definitions.

Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators. All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis.

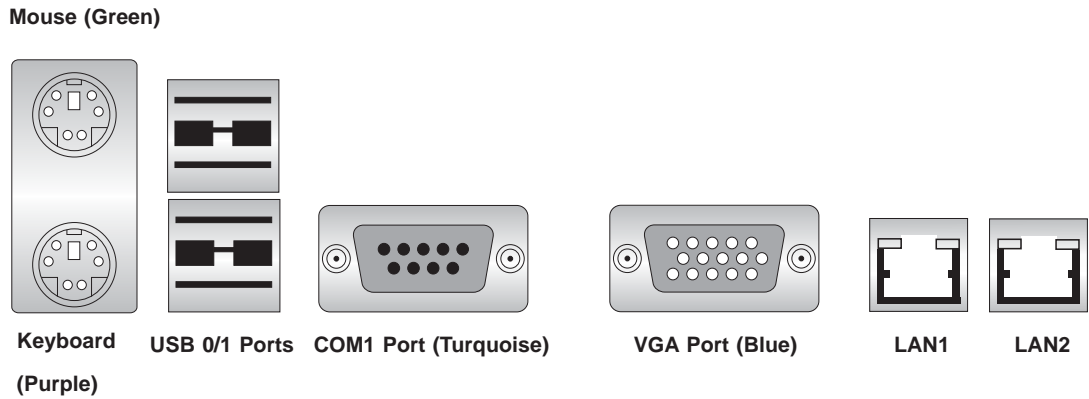
Figure 5-1. Control Panel Header Pins



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. I/O Ports



Note: The COM2 port is a header on the serverboard, located near the floppy connector at the corner of the serverboard. COM2 should be connected to the COM port at the front of the chassis.

5-5 Processor and Heatsink Installation



When handling the processor, avoid placing direct pressure on the label area of the fan. Also, do not place the serverboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

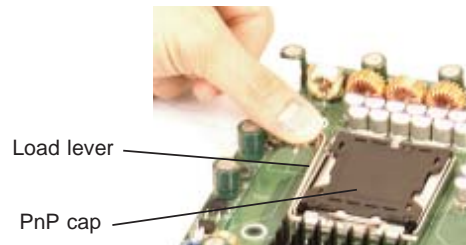
IMPORTANT! Always connect the power cord last and remove it first before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket *before* you install the heatsink and fan. The X7DCL-3/X7DCL-i can support either one or two Xeon 5100 type processors. If installing one processor only, install it into CPU socket #1.

Notes:

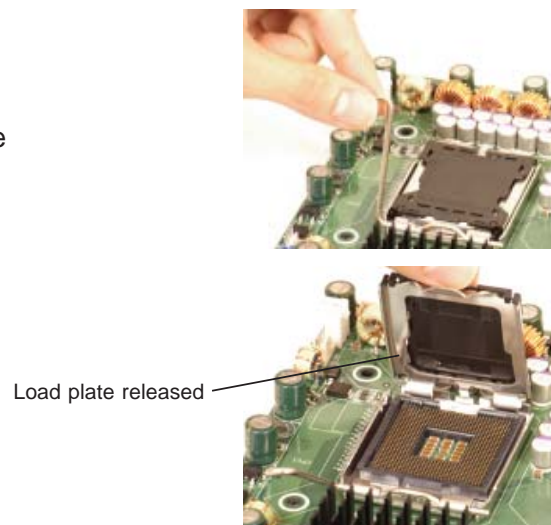
1. Intel's boxed Xeon CPU package contains a CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel-certified multi-directional heatsinks and fans.
2. When purchasing a Xeon CPU or when receiving a serverboard with a CPU pre-installed, make sure that the CPU plastic cap is in place and none of the CPU pins are bent; otherwise, contact the retailer immediately.

Installing the Processor

1. A black PnP cap is attached to the load plate to protect the CPU socket. Press the load lever down and away from the retention clasp to release the load plate from its locked position.



2. Gently lift the load lever to open the load plate.



3. Use your thumb and your index finger to hold the CPU at opposite sides.

4. Align pin1 of the CPU (the corner marked with a triangle) with the notched corner of the CPU socket.

5. Find the corner of the CPU that has a semi-circle cutout below a gold dot (CPU key). This corner should be aligned with the cutout on the socket (socket key).

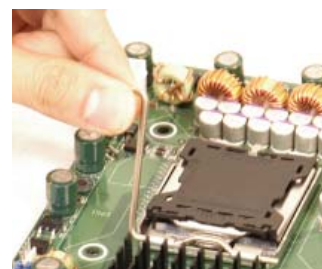
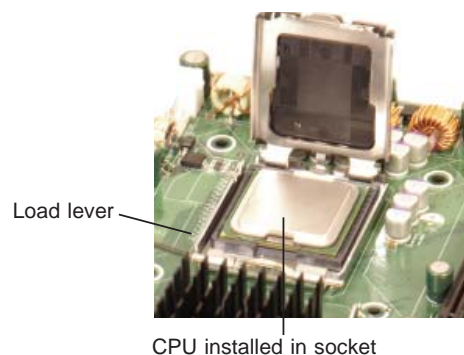
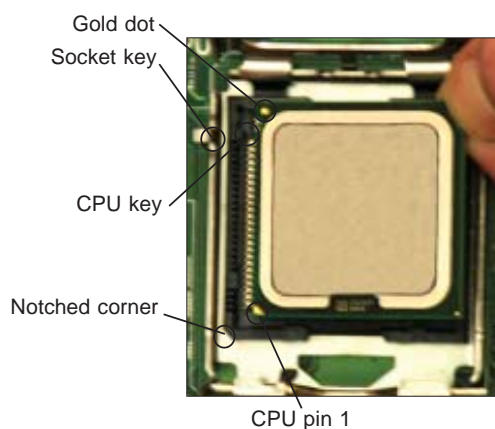
6. Once aligned, carefully lower the CPU straight down into the socket. Do not drop the CPU on the socket, do not move the CPU horizontally or vertically and do not rub the CPU against any surface or any of the contacts, which may damage the CPU and/or contacts.

7. With the CPU in the socket, inspect the four corners of the CPU to make sure that it is properly installed.

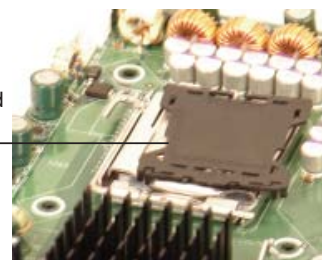
8. Use your thumb to gently push the load lever down until it snaps into the retention clasp.

9. If the CPU is properly installed into the socket, the PnP cap will be automatically released from the load plate when the lever locks. Repeat steps to install a second CPU if desired.

Warning! Keep the plastic PnP cap. The serverboard must be shipped with the PnP cap properly installed to protect the CPU socket. Shipment without the PnP cap properly installed will void the warranty.



PnP cap released
from load plate



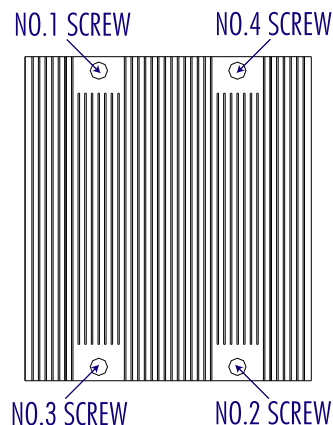
Installing the Heatsink

1. Do not apply any thermal grease to the heatsink or the CPU die; the required amount has already been applied.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

3. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug. Do not fully tighten the screws or you may damage the CPU.)

4. Add the two remaining screws then finish the installation by fully tightening all four screws.



Removing the Heatsink



Warning! We do not recommend that the CPU or the heatsink be removed. However, if you do need to uninstall the heatsink, please follow the instructions below to prevent damage to the CPU or the CPU socket.

1. Unscrew and remove the heatsink screws from the serverboard in the sequence as show in the picture above.
2. Hold the heatsink and gently wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!!)
3. Once the heatsink is loose, remove it from the CPU.
4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease on the surface before you re-install the heatsink.

5-6 Installing Memory

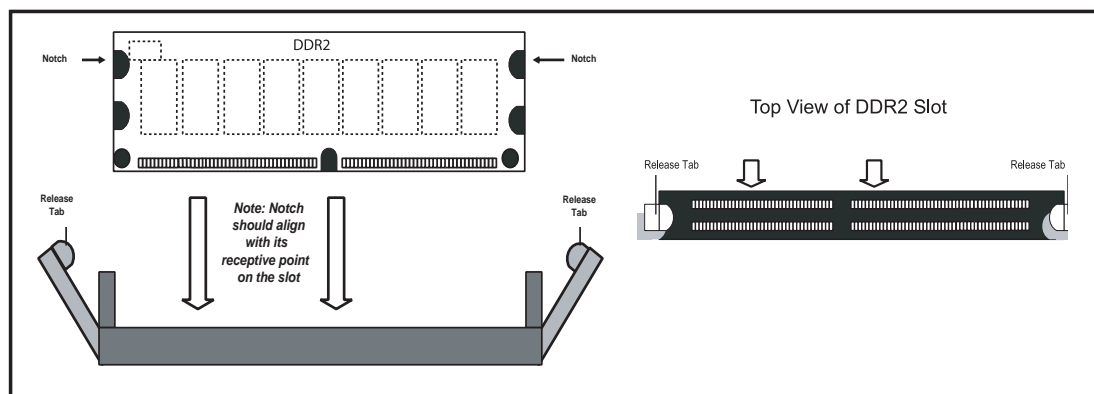
Memory Support

The X7DCL-3/X7DCL-i supports up to 48 GB of Registered ECC DDR2-667 or DDR2-533 SDRAM. The memory scheme is interleaved, so you must populate two slots at a time, beginning with slot 1A and 2A, then slots 1B and 2B and finally slots 1C and 2C. You may populate any even number (2, 4 or 6) of DIMMs. See chart below for optimizing your DIMM installation.

Installing Memory Modules

1. Insert the desired number of DIMMs into the memory slots, starting with DIMM #1A. The memory scheme is interleaved, so you must install two modules at a time, beginning with slots 1A and 2A, then slots 1B and 2B, then slots 1C and slot 2C. See the Memory Installation table Below.
2. Pay attention to the notches along the bottom of the module to prevent inserting it incorrectly.
3. Gently press down on the DIMM module until it snaps into place in the slot (see Figure 5-3).

Figure 5-3. DIMM Installation



To Install: Insert module vertically and press down until it snaps into place. Pay attention to the bottom notches.

To Remove: Use your thumbs to gently push each release tab outward to free the DIMM from the slot.

Memory Installation Table						
No. of DIMMs	Channel 0			Channel 1		
2DIMMs	1A	-----	-----	2A	-----	-----
4DIMMs	1A	1B	-----	2A	2B	-----
6DIMMs	1A	1B	1C	2A	2B	2C

Notes: 1. DIMM slot# specified = DIMM slot to be populated. "----" = DIMM slot to be left unpopulated. 2. Both DDR2 533 MHz and 667MHz DIMMs are supported; however, you need to use the memory modules of the same speed and type.

Note: Due to memory allocation to system devices, memory remaining available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional. Refer to the table below for details.

Possible System Memory Allocation & Availability		
System Device	Size	Physical Memory Remaining (Available) (4 GB Total System Memory)
Firmware Hub flash memory (System BIOS)	1 MB	3.99
Local APIC	4 KB	3.99
Area Reserved for the chipset	2 MB	3.99
I/O APIC (4 Kbytes)	4 KB	3.99
PCI Enumeration Area 1	256 MB	3.76
PCI Express (256 MB)	256 MB	3.51
PCI Enumeration Area 2 (if needed) -Aligned on 256-MB boundary-	512 MB	3.01
VGA Memory	16 MB	2.85
TSEG	1 MB	2.84
Memory available to OS and other applications		2.84

5-7 Adding PCI Cards

The 6015C-M3/6015C-MT includes a preinstalled riser card (p/n CSE-RR1U-E8) designed specifically for use in the SC813MTQ-520C 1U rackmount chassis. This riser card allows a standard size PCI-E x8 card to sit at a 90 degree angle so it can fit inside the chassis.

PCI Card Installation

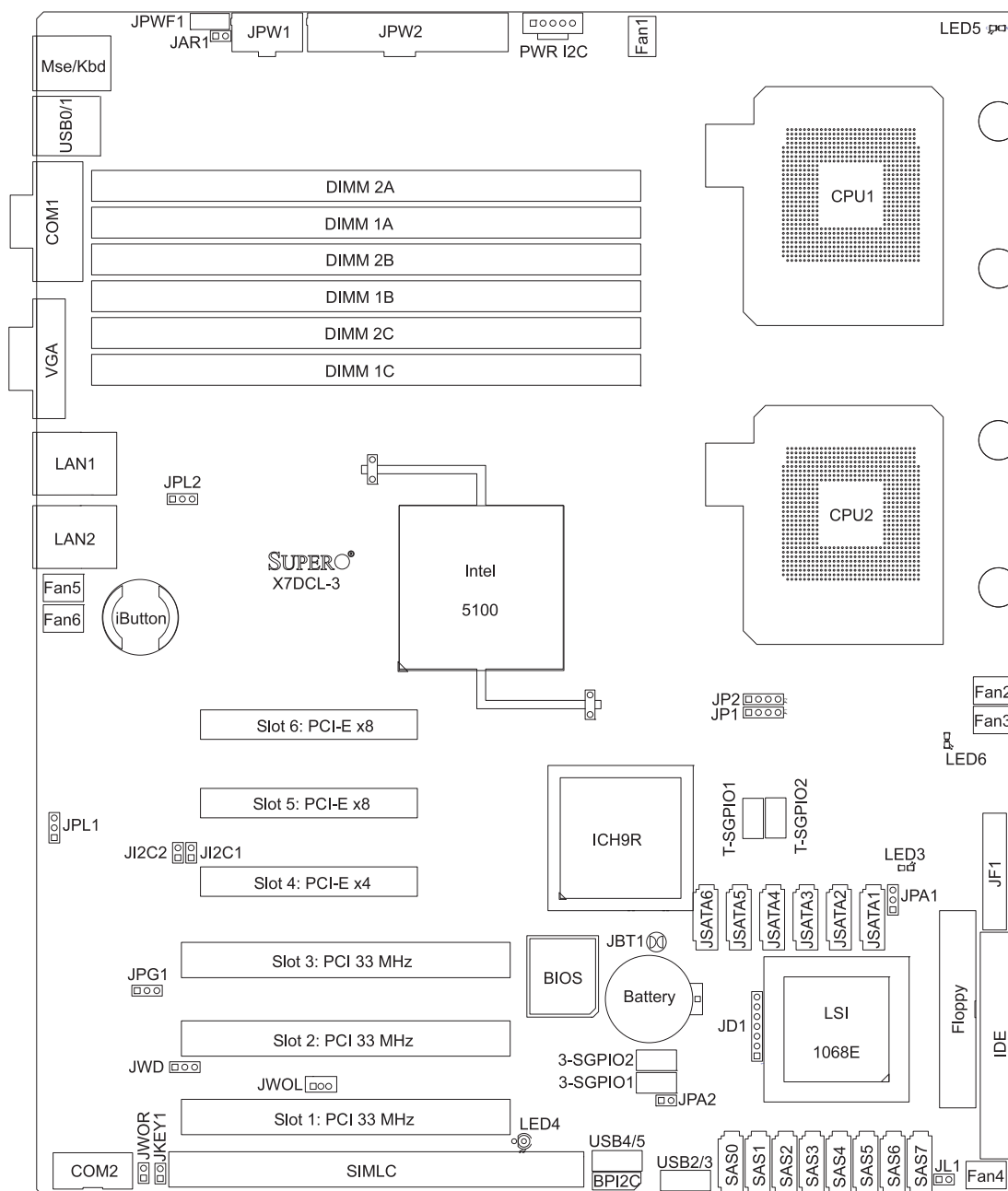
The CSE-RR1U-E8 riser card has already been preinstalled into the serverboard. Perform the following steps to add an add-on card:

1. Remove the PCI slot shield on the chassis by releasing the locking tab.
2. Insert the add-on card into the riser card.
3. Secure the add-on card with the locking tab.

5-8 Serverboard Details

Motherboard Layout

Figure 5-4. X7DCL-3/X7DCL-i Layout



SAS components are included on the X7DCL-3 only.

Jumpers not indicated are for test purposes only.

A square contact pad indicates the location of pin 1.

X7DCL-3/X7DCL-i Quick Reference

Jumper	Description	Default Setting
JBT1	CMOS Clear	See Section 5-9
JI ² C1/JI ² C2	I ² C to PCI/PCI-E Slots	Open (Disabled)
JPA1*	SAS Enable/Disable	Pins 1-2 (Enabled)
JPA2*	SAS RAID Select	Closed (SR RAID)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1/JPL2	LAN1/2 Enable/Disable	Pins 1-2 (Enabled)
JWD	Watch Dog	Pins 1-2 (Reset)

Connector	Description
3-SGPIO-1/3-SGPIO-2	Serial General Purpose I/O Headers (for SAS)
BPI ² C	System Management Bus (I ² C) Header
COM1/COM2	COM1 Serial Port/Header
Fan 1-6	Chassis/CPU Fan Headers
Floppy	Floppy Disk Drive Connector
iButton	iButton (optional) for RAID 5 Support
IDE	IDE Drive/Compact Flash Card Connector
JAR1	Alarm Rest Header
JD1	Onboard Speaker/Power LED
JF1	Front Panel Connector
JKEY1	Keylock Header
JL1	Chassis Intrusion Header
JPW1	+12V 8-pin Processor Power Connector
JPW2	24-pin ATX Power Connector
JPWF1	Power Supply Fail Detect
JSATA1 ~ JSATA6	SATA Ports
JWOL/JWOR	Wake-On-LAN Header/Wake-On-Ring Header
LAN1/2	Gigabit Ethernet (RJ45) Ports
PWR I ² C	I ² C Connector
SAS0 ~ SAS7*	SAS Ports
SIMLC	SIMLC Slot (for IPMI)
T-SGPIO-1/T-SGPIO-2	Serial General Purpose I/O Headers (for SATA)
USB0/1, USB2/3/4/5	Universal Serial Bus (USB) Ports, Headers

* X7DCL-3 only

5-9 Connector Definitions

ATX Power Connector

The primary power supply connector (JPW2) on the X7DCL-3/X7DCL-i meets the SSI (Superset ATX) 24-pin specification. Refer to the table on the right for the pin definitions of the ATX 24-pin power connector. You must also connect the 8-pin (JPW1) processor power connector to your power supply. Refer to the table below right for the PW2 (12V) connector.

ATX Power 24-pin Connector Pin Definitions (JPW2)			
Pin#	Definition	Pin #	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	COM	3	COM
16	PS_ON	4	+5V
17	COM	5	COM
18	COM	6	+5V
19	COM	7	COM
20	Res (NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	COM	12	+3.3V

Processor Power Connector

In addition to JPW2, the 12V 8-pin processor power connector at JPW3 must be connected to your serverboard. See the table on the right for pin definitions.

Processor Power Connector Pin Definitions	
Pins	Definition
1 through 4	Ground
5 through 8	+12V

Required Connection

PW_ON Connector

The PW_ON connector is on pins 1 and 2 of JF1. This header should be connected to the chassis power button. See the table on the right for pin definitions.

Power Button Pin Definitions (JF1)	
Pin#	Definition
1	PW_ON
2	Ground

Reset Connector

The reset connector is located on pins 3 and 4 of JF1 and attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)	
Pin#	Definition
3	Reset
4	Ground

Overheat LED (OH)

Connect an LED to the OH connection on pins 7 and 8 of JF1 to provide advanced warning of chassis overheating. Refer to the table on the right for pin definitions.

OH/Fan Fail LED Pin Definitions (JF1)	
Pin#	Definition
7	Vcc
8	Ground

NIC2 (LAN2) LED

The LED connections for LAN2 are on pins 9 and 10 of JF1. Attach LAN LED cables to display network activity. See the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)	
Pin#	Definition
9	Vcc
10	Ground

NIC1 (LAN1) LED

The LED connections for LAN1 are on pins 11 and 12 of JF1. Attach LAN LED cables to display network activity. See the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)	
Pin#	Definition
11	Vcc
12	Ground

HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach the hard drive LED cable here to display disk activity (for any hard drives on the system, including SAS, Serial ATA and IDE). See the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	Vcc
14	HD Active

Power On LED

The Power On LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

Power LED Pin Definitions (JF1)	
Pin#	Definition
15	5V Stby
16	Control

NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

NMI Button Pin Definitions (JF1)	
Pin#	Definition
19	Control
20	Ground

Fan Headers

There are six fan headers on the X7DCL-3/X7DCL-i. All are 4-pin fans but are backward compatible with traditional 3-pin fans. FAN1 is for the CPU1 heatsink and FAN2 is for the CPU2 heatsink. See the table on the right for pin definitions.

Fan Header Pin Definitions (FAN1-6)	
Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer
4	PWM Control

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on the rear IO panel. The mouse port is above the keyboard port. See the table on the right for pin definitions.

PS/2 Keyboard and Mouse Port Pin Definitions (J14)	
Pin#	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Chassis Intrusion

The Chassis Intrusion header is designated JL1. See the board layout for the location of JL1 and the table on the right for pin definitions.

Chassis Intrusion Pin Definitions (JL1)	
Pin#	Definition
1	Intrusion Input
2	Ground

LAN1/2 (Ethernet Ports)

Two gigabit Ethernet ports (designated LAN1 and LAN2) are located beside the VGA port on the I/O back-plane. These ports accept RJ45 type cables.



Universal Serial Bus (USB)

There are two Universal Serial Bus ports located on the I/O panel and four additional USB headers located on the serverboard. The headers, labeled USB2/3 and USB4/5, can be used to provide front side USB access (cables not included). See the tables on the right for pin definitions.

USB Ports Pin Definitions (USB0/1)	
Pin#	Definitions
1	+5V
2	PO-
3	PO+
4	Ground
5	N/A

USB Headers Pin Definitions (USB2/3, USB4/5)			
USB2/4		USB3/5	
Pin #	Definition	Pin #	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	Key	5	No connection

Wake-On-LAN

The Wake-On-LAN header is designated JWOL on the serverboard. See the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this function. (You must also have a LAN card with a Wake-On-LAN connector and cable to use this feature.)

Wake-On-LAN Pin Definitions (JWOL)	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

Wake-On-Ring

The Wake-On-Ring header is designated JWOR. This function allows your computer to receive and be "awakened" by an incoming call when in the suspend state. See the table on the right for pin definitions. You must also have a WOR card and cable to use this feature.

Wake-On-Ring Pin Definitions (JWOR)	
Pin#	Definition
1	Ground (Black)
2	Wake-up

Power Supply Fail Detect

Connect a cable from your power supply to JPWF1 to provide warning of power supply failure. This warning signal is passed through the PWR_LED pin to indicate of a power failure on the chassis. See the table on the right for pin definitions.

PWR Supply Fail Detect Pin Definitions (JPWF1)	
Pin#	Definition
1	PWR 1: Fail
2	PWR 2: Fail
3	PWR 3: Fail
4	Signal: Alarm Reset

Note: This feature is only available when using Supermicro redundant power supplies.

Alarm Reset

If redundant power supplies are installed and the Power Supply Fail Detect jumper (JPWF1) is enabled, the system will notify you when a power module fails. Connect JAR to a micro-switch to enable you to turn off the power fail alarm. See the table on the right for pin definitions.

Alarm Reset Pin Definitions (JAR)	
Pin Setting	Definition
Pin 1	Ground
Pin 2	+5V

PWR I²C

This connector is for I²C, which may be used to monitor the status of the power supply, fan and system temperature. See the table on the right for pin definitions.

PWR I ² C Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	Power Fail
4	Ground
5	+3.3V

BPI²C

This connector provides backpanel access for I²C, which may be used to monitor the status of the power supply, fan and system temperature. See the table on the right for pin definitions.

BPI ² C Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	Power Fail
4	Ground
5	+3.3V

Serial Ports

Two serial ports are included on the serverboard: COM1 is a port located beside the USB ports and COM2 is a header located on the corner of the board near the SIMLC slot. See the table on the right for pin definitions.

Serial Port Pin Definitions (COM1/COM2)			
Pin #	Definition	Pin #	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Note: Pin 10 is included on the header but not on the port. NC indicates no connection.

SGPIO Headers

Four SGPIO (Serial General Purpose Input/Output) headers are included on the serverboard. These headers are used to communicate with the System Monitoring chip on the backplane. T-SGPIO1 and T-SGPIO2 are used to monitor SATA activity while 3-SGPIO1 and 3-SGPIO2 (X7DCL-3 only) are used for SAS activity. See the table on the right for pin definitions.

SGPIO Headers Pin Definitions (T-SGPIO1, T-SGPIO2/3-SGPIO1, 3-SGPIO2)			
Pin#	Definition	Pin	Definition
1	NC	2	NC
3	Ground	4	DATA Out
5	Load	6	Ground
7	Clock	8	NC

Note: NC indicates no connection.

Power LED/Speaker

On the JD1 header, pins 1-3 are for a power LED and pins 4-7 are for the speaker. See the table on the right for speaker pin definitions.

Note: The speaker connector pins are for use with an external speaker. If you wish to use the onboard speaker, you should close pins 6-7 with a jumper.

Power LED/Speaker Connector Pin Definitions (JD1)	
Pin Setting	Definition
Pins 6-7	Internal Speaker
Pins 4-7	External Speaker

Keylock

The keyboard lock connection is designated JKEY1. Utilizing this header allows you to inhibit any actions made on the keyboard, effectively "locking" it.

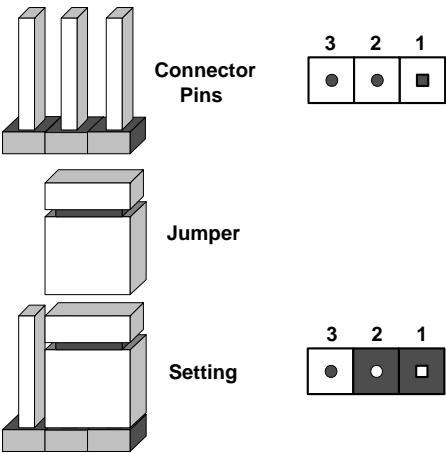
Keylock Pin Definitions (JKEY1)	
Pin#	Definition
1	Ground
2	Keylock R-N

5-10 Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the serverboard layout pages for jumper locations.

Note: On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.



CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS. To clear CMOS,

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system

Note: Do not use the PW ON connector to clear CMOS.

VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

VGA Enable/Disable Jumper Settings (JPG1)	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

LAN1/LAN2 Enable/Disable

Change the setting of jumper JPL1 to enable or disable the LAN1 port and JPL2 to enable or disable the LAN2 port on the serverboard. See the table on the right for jumper settings. The default setting is enabled.

LAN1/2 Enable/Disable Jumper Settings (JPL1/2)	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

SAS Enable/Disable

JPA1 allows you to enable or disable the SAS controller. The default position is on pins 1 and 2 to enable SAS. See the table on the right for jumper settings. This feature is only available on the X7DCL-3.

SAS Enable/Disable Jumper Settings (JPA1)	
Jumper Settings	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

SAS RAID Select

JPA2 allows you to select between SR RAID, which is the default and enables SAS RAID, or IT RAID, which treats SAS drives as non-RAID drives and requires a firmware flash. See the table on the right for jumper settings. Contact Supermicro tech support if using the IT RAID setting. This jumper is available on the X7DCL-3 only.

SAS RAID Select Jumper Settings (JPA2)	
Jumper Setting	Definition
Open	IT RAID
Closed	SR RAID

Note: SR = Software RAID IT = Integrate Target mode

Watch Dog

JWD enables the Watch Dog function, a system monitor that takes action when a software application freezes the system. Jumping pins 1-2 will have WD reboot the system if a program freezes. Jumping pins 2-3 will generate a non-maskable interrupt for the program that has frozen. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

Watch Dog Jumper Settings (JWD)	
Jumper Setting	Definition
Pins 1-2	Reset
Pins 2-3	NMI
Open	Disabled

Note: when Watch Dog is enabled, the user must write their own application software to disable the Watch Dog Timer.

I²C Bus to PCI/PCI-Exp. Slots

Jumpers JI²C1 and JI²C2 allow you to connect the System Management Bus (I²C) to the PCI and PCI-E slots. The default setting is Open (Disabled.) Both jumpers must be set to the same setting. See the table on the right for jumper settings.

I ² C to PCI/PCI-E Slots Jumper Settings (JI ² C1/JI ² C2)		
Jumper Setting	Definition	
JI ² C1: Closed	JI ² C2: Closed	Enabled
JI ² C1: Open	JI ² C2: Open	Disabled

5-11 Onboard Indicators

LAN1/LAN2 LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gb LAN port, one LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

LAN LED (Connection Speed Indicator)	
LED Color	Definition
Off	10 MHz
Green	100 MHz
Amber	1 GHz

Onboard Power LED (LED3)

The onboard power LED is designated LE3. When this LED is lit, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components.

System Status LED (LED4)

There is a System Status LED Indicator (LED4) located near the SIMLC slot. This LED displays different colors to show the status of the system. Refer to the table on the right for system status.

System Status LED Indicator (LED4)	
LED Color	Definition
Green	Power On, system: normal
Red	PWR on, PWR problem(s) occur(s) or 3rd PS not properly installed
Yellow	S5 or S4

CPU_VRM Overheat LED Indicators (LED5/LED6)

The two CPU_VRM Overheat LEDs designated LE5/LE6 provide indication for CPU1 and CPU2 VRM overheat, respectively. Refer to the table on the right for LED5 and LED6 indications.

CPU_VRM Overheat LED Indicators (LED5/LED6)	
LED#	Description
LED: On	CPU1_VRM Overheat
LED6: On	CPU2_VRM Overheat

5-12 Floppy and IDE Drive Connections

Use the following information to connect the IDE hard disk drive cables.

- A red mark on a wire typically designates the location of pin 1.
- The 80-wire ATA100/66 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this new technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

Floppy Connector

The floppy connector is located by the IDE slot. See the table at right for pin definitions.

Floppy Drive Connector Pin Definitions (Floppy)			
Pin#	Definition	Pin #	Definition
1	Ground	2	FDHDIN
3	Ground	4	Reserved
5	Key	6	FDEDIN
7	Ground	8	Index
9	Ground	10	Motor Enable
11	Ground	12	Drive Select B
13	Ground	14	Drive Select B
15	Ground	16	Motor Enable
17	Ground	18	DIR
19	Ground	20	STEP
21	Ground	22	Write Data
23	Ground	24	Write Gate
25	Ground	26	Track 00
27	Ground	28	Write Protect
29	Ground	30	Read Data
31	Ground	32	Side 1 Select
33	Ground	34	Diskette

IDE Connector

There are no jumpers to configure the onboard IDE interface "IDE". See the table below for pin definitions.

IDE Drive Connectors Pin Definitions (IDE)			
Pin#	Definition	Pin #	Definition
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DRQ3	22	Ground
23	I/O Write	24	Ground
25	I/O Read	26	Ground
27	IOCHRDY	28	BALE
29	DACK3	30	Ground
31	IRQ14	32	IOCS16
33	Addr1	34	Ground
35	Addr0	36	Addr2
37	Chip Select 0	38	Chip Select 1
39	Activity	40	Ground

SAS Ports

There are eight SAS ports included on the serverboard. See the table on the right for pin definitions.

Note: JPA1 must be set correctly to enable the SAS controller.

SAS Port Pin Definitions (SAS0 ~ SAS7)	
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

SATA Ports

There are no jumpers to enable the SATA ports, which are designated JSATA1 ~ JSATA6. See the table on the right for pin definitions.

SATA Port Pin Definitions (JSATA1 ~ JSATA6)	
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC813MTQ-520C chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required: The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

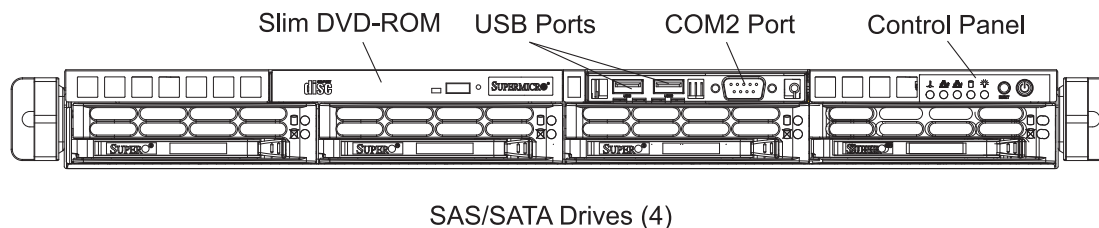
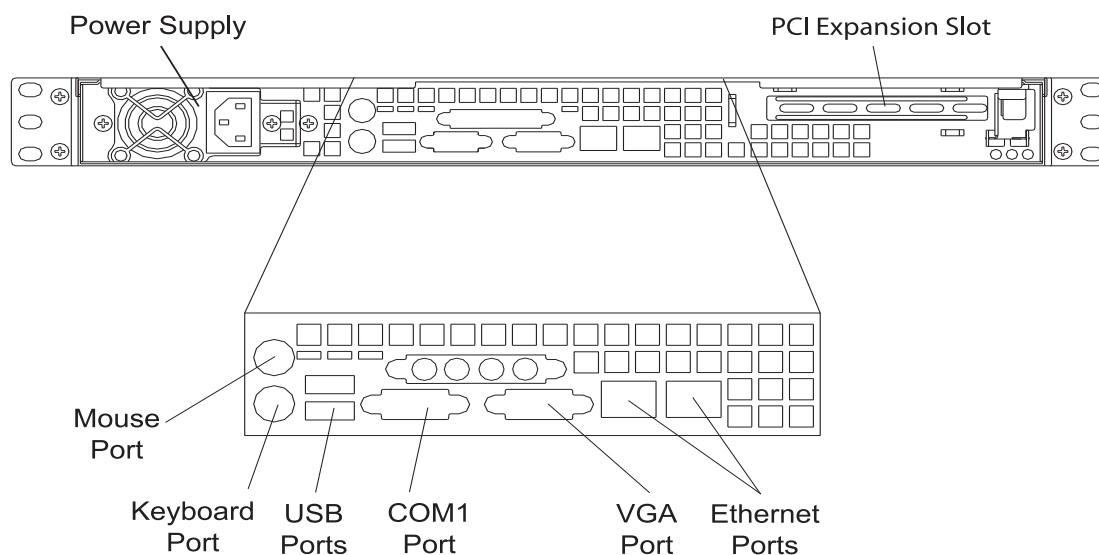
Electric Static Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Figure 6-1. Chassis Front View**Figure 6-2. Chassis Rear View**

6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system control buttons and status indicators. These wires have been bundled together in a ribbon cable to simplify the connection. Connect the cable from JF1 on the serverboard to the control panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path. The LEDs inform you of system status. See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

6-3 System Fans

Four 4-cm high-performance 12500 rpm fans provide the cooling for the SuperServer 6015C-M3/6015C-MT. The chassis includes air seals under the fans and at the chassis cross section, which separates the drive bay area from the serverboard area of the chassis to promote better airflow. It is highly important that the air seal is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis.

Fan speed may be controlled by a setting in BIOS (see Chapter 7).

System Fan Failure

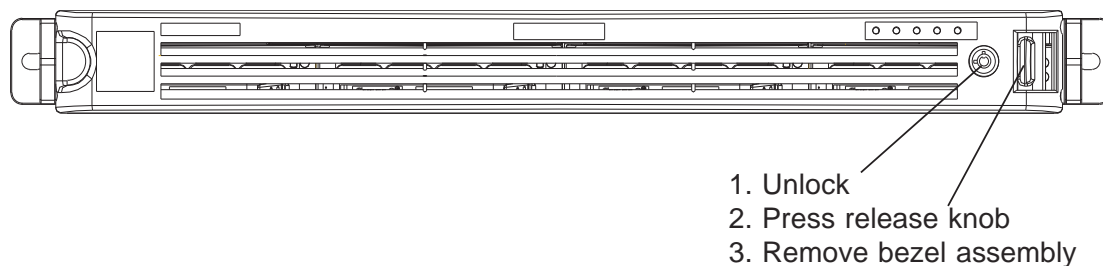
If a fan fails, you will need to have it replaced with the same type. Contact your vendor or Supermicro for information on replacement fans.

6-4 Drive Bay Installation/Removal

Removing the Front Bezel

If your system has a front bezel (optional) attached to the chassis, you must first remove it to gain access to the drive bays. To remove the bezel, first unlock the front of the chassis then press the release knob (see Figure 6-3). Carefully remove the bezel with both hands. A filter located within the bezel can be removed for replacement/cleaning. It is recommended that you keep a maintenance log of filter cleaning/replacement, since its condition will affect the airflow throughout the whole system.

Figure 6-3. Removing the Front Bezel



Accessing the Drive Bays

SAS/SATA Drives: Because of their hotswap capability, you do not need to access the inside of the chassis or power down the system to install or replace SAS/SATA drives. Proceed to the next step for instructions. **Note:** The operating system you use must have RAID support to enable the hot-swap capability of the SAS/SATA drives.

DVD-ROM Drive: For installing/removing a DVD-ROM drive, you will need to gain access to the inside of the server by removing the top cover of the chassis. Proceed to the "DVD-ROM Drive Installation" section in this chapter for instructions. Note that only a "slim" DVD-ROM drive will fit into the 6015C-M3/6015C-MT.



Use caution when working around the SAS/SATA backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane. Also, regardless of how many SAS/SATA drives are installed, all four drive carriers must remain in the chassis to maintain proper airflow.

SAS/SATA Drive Installation

The SAS/SATA drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the system. For this reason, even empty carriers without drives installed must remain in the chassis.

Mounting a SAS/SATA Drive in a Drive Carrier

1. To add a new drive, install it into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.
2. Secure the drive to the carrier with six screws, as shown in Figure 6-4.

Installing/Removing Hot-Swap SAS/SATA Drives

1. Push the release button located beside the drive LEDs.
2. Swing the colored handle fully out and use it to pull the unit straight out (see Figure 6-5).

Note: Your operating system must have RAID support to enable the hot-swap capability of the SAS/SATA drives.

Figure 6-4. Mounting a Drive in a Carrier

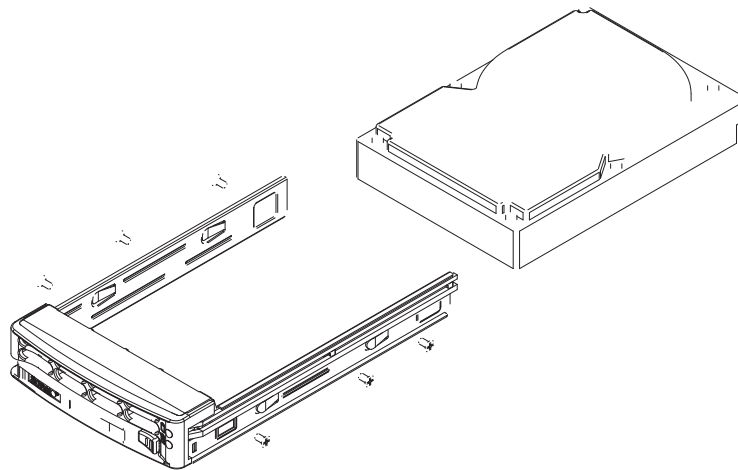
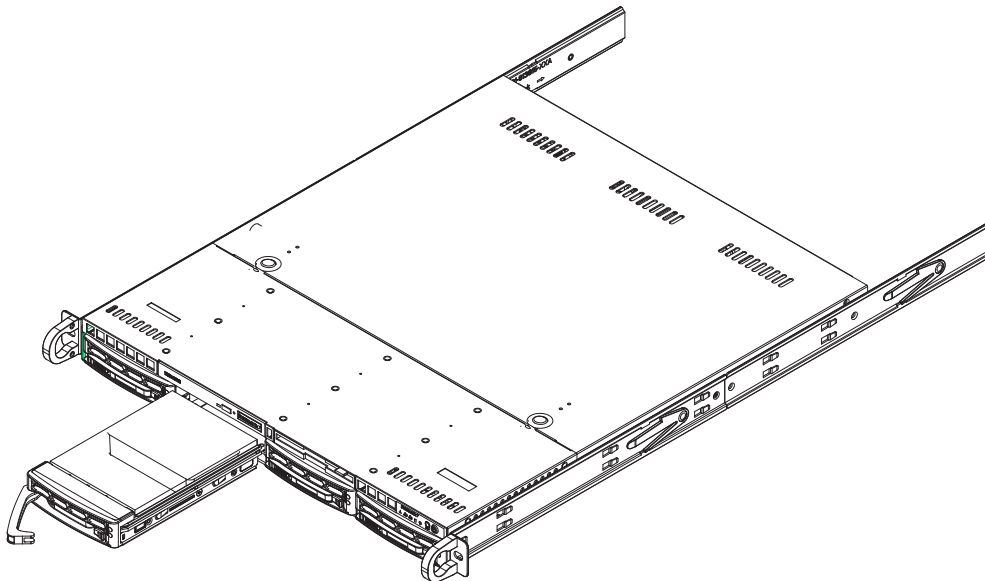


Figure 6-5. Removing a SAS/SATA Drive from the Server



DVD-ROM Drive Installation

The top cover of the chassis must be opened to gain full access to the DVD-ROM drive bay. The 6015C-M3/6015C-MT accommodates only slim DVD-ROM drives. Side mounting brackets are needed to mount a slim DVD-ROM drive in the 6015C-M3/6015C-MT server.

Accessing the Inside of the Chassis

1. Release the retention screws that secure the server unit to the rack.
2. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click").
3. Next, depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server. **Note:** You must power down the system before installing or removing floppy or IDE components.

Accessing a DVD-ROM

1. With the chassis cover removed, unplug the power and data cables from the drive.
2. Locate the locking tab at the rear of the drive. It will be on the left side of the drive when viewed from the front of the chassis.
3. Pull the tab away from the drive and push the drive unit out the front of the chassis.
4. Add a new drive by following this procedure in reverse order. You may hear a faint *click* of the locking tab when the drive is fully inserted.
5. Remember to reconnect the data and power cables to the drive before replacing the chassis cover and restoring power to the system.

6-5 Power Supply

The SuperServer 6015C-M3/6015C-MT has a single 520 watt power supply. This power supply has the capability of operating at 100 - 240 input volts. Depress the main power button on the front of the chassis and then unplug the AC power cord to completely remove power from the system before removing the power supply.

Power Supply Failure

If the power supply module fails, the system will shut down and you will need to replace it. Replacement modules can be ordered directly from Supermicro (PWS-521-1H - see contact information in Chapter 1).

Replacing the Power Supply

Removing the power supply

1. First power down the system and unplug the AC power cord from the server.
2. Remove the top chassis cover by releasing the retention screws that secure the module to the rack, then grasp the two handles on either side and pull the module straight out until it locks (you will hear a "click").
3. Next, depress the two buttons on the top of the chassis to release the top cover and push it away from you.
4. Lift the top cover from the chassis to gain full access to the inside of the server.
5. To remove the failed power module, remove the two screws on the back of the power supply, which secure it to the chassis.
6. You can then lift the module straight out of the chassis. (The power cord should have already been removed.)

Installing a New Power Supply

1. Replace the failed power supply with another identical power supply module.
2. Carefully insert the new module into position in the chassis and secure it with the two screws at the rear of the module.
3. Make sure the power switch on the power supply is in the off position.

4. Reconnect the power cord.
5. Replace the chassis top cover and push the module back into the rack.
6. Finish by turning the power switch on the power supply on, and then depress the power button on the front of the system.

Chapter 7

BIOS

7-1 Introduction

This chapter describes the Phoenix BIOS™ Setup utility for the X7DCL-3/X7DCL-i. The Phoenix ROM BIOS is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Manual Download area of the Supermicro web site <<http://www.supermicro.com>> for any changes to the BIOS that may not be reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The Phoenix BIOS stores the system parameters, types of disk drives, video displays, etc. in the CMOS. The CMOS memory requires very little electrical power. When the computer is turned off, a backup battery provides power to the CMOS Logic, enabling it to retain system parameters. Each time the computer is powered on, the computer is configured with the values stored in the CMOS Logic by the system BIOS, which gains control at boot up.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing the <Delete> key at the appropriate time during system boot. (See below.)

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Security and Power menus. Beginning with Section 7-3, detailed descriptions are given for each parameter setting in the Setup utility.



Warning: Do not shut down or reset the system while updating BIOS to prevent possible boot failure,

7-2 Running Setup

Default settings are in bold text unless otherwise noted.

The BIOS setup options described in this section are selected by choosing the appropriate text from the main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see the next page).

When you first power on the computer, the Phoenix BIOS™ is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Delete> immediately after turning the system on, or
2. When the message shown below appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the <Delete> key to activate the main Setup menu:

Press the <Delete> key to enter Setup

7-3 Main BIOS Setup

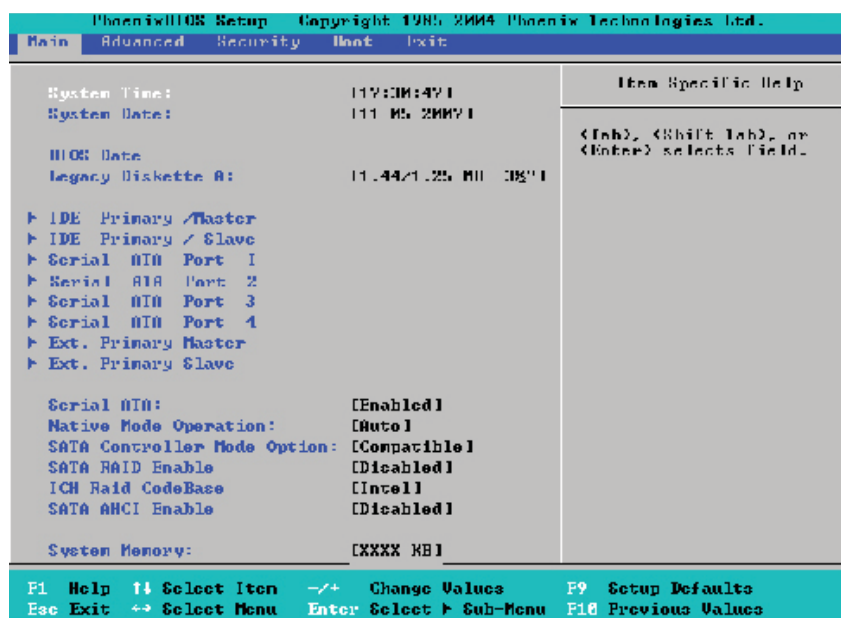
All main Setup options are described in this section. The main BIOS Setup screen is displayed below.

Use the Up/Down arrow keys to move among the different settings in each menu. Use the Left/Right arrow keys to change the options for each setting.

Press the <Esc> key to exit the CMOS Setup Menu. The next section describes in detail how to navigate through the menus.

Items that use submenus are indicated with the ► icon. With the item highlighted, press the <Enter> key to access the submenu.

Main BIOS Setup Menu



Main Setup Features

System Time

To set the system date and time, key in the correct information in the appropriate fields. Then press the <Enter> key to save the data.

System Date

Using the arrow keys, highlight the month, day and year fields, and enter the correct data. Press the <Enter> key to save the data.

BIOS Date

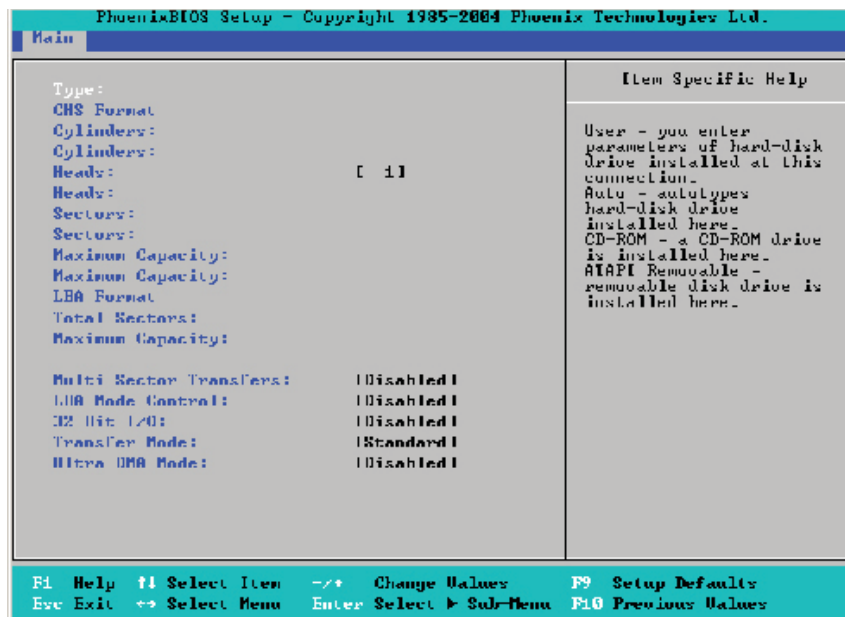
This field displays the date when this version of BIOS was built.

Legacy Diskette A

This setting allows the user to set the type of floppy disk drive installed as diskette A. The options are Disabled, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, **1.44/1.25MB**, 3.5 in and 2.88MB 3.5 in.

►IDE Primary Master/Slave, SATA Port1, SATA Port2, SATA Port3 and SATA Port4

These settings allow the user to set the parameters of IDE Primary Master/Slave, SATA Port1 Master/Slave, SATA Port2 Master/Slave, SATA Port3 Master, and SATA Port4 Master slots. Hit <Enter> to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are:



Type

This option allows the user to select the type of IDE hard drive. The option **Auto** will allow the BIOS to automatically configure the parameters of the HDD installed at the connection. Enter a number between 1 to 39 to select a predetermined HDD type. Select User to allow the user to enter the parameters of the HDD installed. Select CDROM if a CDROM drive is installed. Select ATAPI if a removable disk drive is installed.

CHS Format

The following items will be displayed by the BIOS:

TYPE: This item displays the type of IDE or SATA Device.

Cylinders: This item indicates the status of Cylinders.

Headers: This item indicates the number of headers.

Sectors: This item displays the number of sectors.

Maximum Capacity: This item displays the maximum storage capacity of the system.

LBA Format

The following items will be displayed by the BIOS:

Total Sectors: This item displays the number of total sectors available in the LBA Format.

Maximum Capacity: This item displays the maximum capacity in the LBA Format.

Multi-Sector Transfers

This item allows the user to specify the number of sectors per block to be used in multi-sector transfer. The options are **Disabled**, 4 Sectors, 8 Sectors, and 16 Sectors.

LBA Mode Control

This item determines whether the Phoenix BIOS will access the IDE Channel 0 Master Device via the LBA mode. The options are Enabled and **Disabled**.

32 Bit I/O

This option allows the user to enable or disable the function of 32-bit data transfer. The options are Enabled and **Disabled**.

Transfer Mode

This option allows the user to set the transfer mode. The options are **Standard**, Fast PIO1, Fast PIO2, Fast PIO3, Fast PIO4, FPIO3/DMA1 and FPIO4/DMA2.

Ultra DMA Mode

This option allows the user to select Ultra DMA Mode. The options are **Disabled**, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, and Mode 5.

Serial ATA

This setting allows the user to enable or disable the function of the Serial ATA. The options are Disabled and **Enabled**.

Native Mode Operation

Select the native mode for ATA. The options are: Parallel ATA, Serial ATA, Both, and **Auto**.

SATA Controller Mode

Select **Compatible** to allow the SATA and PATA drives to be automatically-detected and be placed in the Legacy Mode by the BIOS. Select Enhanced to allow the SATA and PATA drives to be to be automatically-detected and be placed in the Native IDE Mode. (**Note: The Enhanced mode is supported by the Windows 2000 OS or a later version.**)

When the SATA Controller Mode is set to "Enhanced", the following items will display:

Serial ATA (SATA) RAID Enable

Select Enable to enable Serial ATA RAID Functions. (For the Windows OS environment, use the RAID driver if this feature is set to Enabled. If this item is set to **Disabled**, the item-SATA AHCI Enable will be available.) The options are Enabled and **Disabled**.

ICH RAID Code Base

Select Intel to enable Intel's SATA RAID firmware to configure Intel's SATA RAID settings.

SATA AHCI

Select Enable to enable the function of Serial ATA Advanced Host Interface. (Take caution when using this function. This feature is for advanced programmers only. The options are Enabled and **Disabled**.)

System Memory

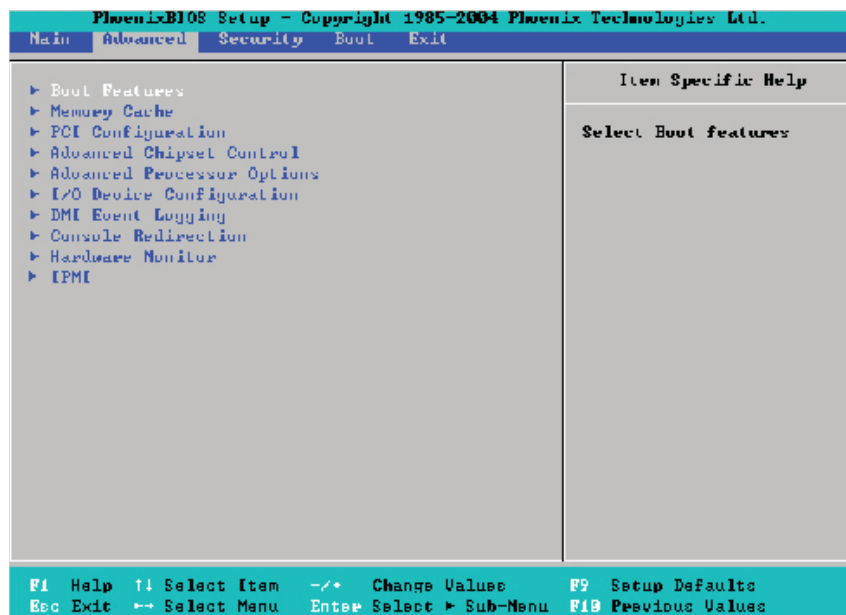
This display informs you how much system memory is recognized as being present in the system.

Extended Memory

This display informs you how much extended memory is recognized as being present in the system.

7-4 Advanced Setup

Choose Advanced from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. The items with a triangle beside them have sub menus that can be accessed by highlighting the item and pressing <Enter>.



▶ Boot Features

Access the submenu to make changes to the following settings.

QuickBoot Mode

If enabled, this feature will speed up the POST (Power On Self Test) routine by skipping certain tests after the computer is turned on. The settings are **Enabled** and Disabled. If Disabled, the POST routine will run at normal speed.

QuietBoot Mode

This setting allows you to **Enable** or Disable the graphic logo screen during boot-up.

POST Errors

Set to **Enabled** to display POST Error Messages if an error occurs during bootup. If set to Disabled, the system will continue to boot without displaying any error message even when a boot error occurs.

ACPI Mode

Use the setting to determine if you want to employ ACPI (Advanced Configuration and Power Interface) power management on your system. The options are **Yes** and No.

Power Button Behavior

If set to **Instant-Off**, the system will power off immediately as soon as the user hits the power button. If set to 4-sec., the system will power off when the user presses the power button for 4 seconds or longer. The options are instant-off and 4-sec override.

Resume On Modem Ring

Select On to “wake your system up” when an incoming call is received by your modem. The options are On and **Off**.

Power Loss Control

This setting allows you to choose how the system will react when power returns after an unexpected loss of power. The options are Stay Off, Power On, and **Last State**.

Watch Dog

If enabled, this option will automatically reset the system if the system is not active for more than 5 minutes. The options are Enabled and **Disabled**.

Summary Screen

This setting allows you to **Enable** or Disable the summary screen which displays the system configuration during startup.

►Memory Cache

Cache System BIOS Area

This setting allows you to designate a reserve area in the system memory to be used as a System BIOS buffer to allow the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** to enable this function, and this area will be reserved for BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

Cache Video BIOS Area

This setting allows you to designate a reserve area in the system memory to be used as a Video BIOS buffer to allow the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** to enable the function and this area will be reserved for Video BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

Cache Base 0-512K

If enabled, this feature will allow the data stored in the base memory area: block 0-512K to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or to be written into L1, L2 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the base memory area of Block 0-512K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Cache Base 512K-640K

If enabled, this feature will allow the data stored in the memory area: 512K-640K to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the base memory area of Block 512-640K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Cache Extended Memory

If enabled, this feature will allow the data stored in the extended memory area to be cached (written) into a buffer, a storage area in the Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the extended memory area above 1MB. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Discrete MTRR Allocation

If enabled, MTRRs (-Memory Type Range Registers) are configured as distinct, separate units and cannot be overlapped. If enabled, the user can achieve better graphic effects when using a Linux graphic driver that requires the write-combining configuration with 4GB or more memory. The options are Enabled and **Disabled**.

►PCI Configuration

Access the submenu to make changes to the following settings for PCI devices.

Onboard GLAN-1/Onboard GLAN-2 (Gigabit- LAN) OPROM Configure

Select Enabled to allow the system to boot from the GLAN-1 connection or the GLAN-2 connection. The options are **Disabled** and Enabled.

Reset Configuration Data

If set to Yes, this setting clears the Extended System Configuration Data- (ESCD) area. The options are Yes and **No**.

►Slot1 PCI 33MHz, Slot2 PCI 33MHz, Slot3 PCI 33MHz, Slot4 PCI-Exp. x4, Slot5 PCI-Exp. x8, and Slot6 PCI-Exp. x8

Access the submenu for each of the settings above to make changes to the following:

Option ROM Scan

When enabled, this setting will initialize the device expansion ROM. The options are **Enabled** and Disabled.

Enable Master

This setting allows you to enable the selected device as the PCI bus master. The options are **Enabled** and Disabled.

Latency Timer

This setting allows you to set the clock rate for Bus Master. A high-priority, high-throughout device may benefit from a greater clock rate. The options are **Default**, 0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, and 00E0h. For Unix, Novell and other Operating Systems, please select the option: other. If a drive fails after the installation of a new software, you might want to change this setting and try again. A different OS requires a different Bus Master clock rate.

Large Disk Access Mode

This setting determines how large hard drives are to be accessed. The options are **DOS** or Other (for Unix, Novelle NetWare and other operating systems).

► Advanced Chipset Control

Access the submenu to make changes to the following settings.



Warning: Take Caution when changing the Advanced settings. An incorrect setup, a very high DRAM frequency or an incorrect DRAM timing may cause the system become unstable. When this occurs, reset the setting to the default setting.

Crystal Beach Features

This feature cooperates with the Intel I/O AT (Acceleration Technology) to accelerate the performance of TOE devices. (Note: A TOE device is a specialized, dedicated processor that is installed on an add-on card or a network card to handle some or all packet processing of this add-on card. For this motherboard, the TOE device is built inside the ICH9R South Bridge chip.) The options are **Enabled** and Disabled.

SERR Signal Condition

This setting specifies the ECC Error conditions that an SERR# is to be asserted. The options are None, **Single Bit**, Multiple Bit, and Both.

4GB PCI Hole Granularity

This feature allows you to select the granularity of PCI hole for PCI slots. If MTRRs are not enough, this option may be used to reduce MTRR occupation. The options are: **256 MB**, 512 MB, 1GB and 2GB.

Route Port 80h Cycles to

This feature allows the user to decide which bus to send debug information to. The options are Disabled, PCI and **LPC**.

Enabling Multi-Media Timer

Select Yes to activate a set of timers that are alternative to the traditional 8254 timers for the OS use. The options are Yes and **No**.

USB Host Controller 1

Select Enabled to enable USB Host Controller 1. The options are **Enabled** and Disabled.

USB Host Controller 2

Select Enabled to enable USB Host Controller 2. The options are **Enabled** and Disabled.

Legacy USB Support

This setting allows you to enable support for Legacy USB devices. The settings are **Enabled** and Disabled.

► Advanced Processor Options

Access the submenu to make changes to the following settings.

CPU Speed

This is a display that indicates the speed of the installed processor.

Frequency Ratio (Available when supported by the CPU.)

The feature allows the user to set the internal frequency multiplier for the CPU. The options are: **Default**, x12, x13, x14, x15, x16, x17 and x18.

Core-Multi-Processing (Available when supported by the CPU.)

Set to **Enabled** to use a processor's Second Core and beyond. (Please refer to Intel's web site for more information.) The options are **Disabled** and **Enabled**.

Thermal Management 2 (Available when supported by the CPU.)

Set to **Enabled** to use Thermal Management 2 (TM2) which will lower CPU voltage and frequency when the CPU temperature reaches a predefined overheat threshold. Set to **Disabled** to use Thermal Manager 1 (TM1), allowing CPU clocking to be regulated via CPU Internal Clock modulation when the CPU temperature reaches the overheat threshold.

C1 Enhanced Mode (Available when supported by the CPU.)

Set to **Enabled** to enable Enhanced Halt State to lower CPU voltage/frequency to prevent overheat. The options are **Enabled** and **Disabled**. (**Note:** please refer to [Intel's web site for detailed information.](#))

Execute Disable Bit (Available if supported by the CPU and the OS.)

Set to **Enabled** to enable Execute Disable Bit and allow the processor to classify areas in memory where an application code can execute and where it cannot, and thus preventing a worm or a virus from inserting and creating a flood of codes to overwhelm the processor or damage the system during an attack. This feature is available when your OS and your CPU support the function of Execute Disable Bit. The options are **Disabled** and **Enabled**. **Note:** For more information regarding hardware/software support for this function, please refer to Intel's and Microsoft's web sites.

Intel <R> Virtualization Technology (Available when supported by the CPU.)

Select **Enabled** to use the feature of Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and **Disabled**. **Note:** If there is any change to this setting, you will need to power off

and restart the system for the change to take effect. Please refer to Intel's web site for detailed information.

Intel EIST Support (Available when supported by the CPU.)

Select Enabled to use the Enhanced Intel SpeedStep Technology and allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. The options are Enabled and Disabled. Please refer to Intel's web site for detailed information.

►I/O Device Configuration

Access the submenu to make changes to the following settings.

KBC Clock Input

This setting allows you to select clock frequency for KBC. The options are 6MHz, 8MHz, **12MHz**, and 16MHz.

Serial Port A

This setting allows you to assign control of serial port A. The options are **Enabled** (user defined), Disabled, and Auto (BIOS- or OS- controlled).

Base I/O Address

This setting allows you to select the base I/O address for serial port A. The options are **3F8**, 2F8, 3E8, and 2E8.

Interrupt

This setting allows you to select the IRQ (interrupt request) for serial port A. The options are IRQ3 and **IRQ4**.

Serial Port B

This setting allows you to assign control of serial port B. The options are **Enabled** (user defined), Disabled, Auto (BIOS controlled) and OS Controlled.

Mode

This setting allows you to set the type of device that will be connected to serial port B. The options are **Normal** and IR (for an infrared device).

Base I/O Address

This setting allows you to select the base I/O address for serial port B. The options are 3F8, **2F8**, 3E8 and 2E8.

Interrupt

This setting allows you to select the IRQ (interrupt request) for serial port B. The options are **IRQ3** and IRQ4.

Floppy Disk Controller

This setting allows you to assign control of the floppy disk controller. The options are **Enabled** (user defined), Disabled, and Auto (BIOS and OS controlled).

Base I/O Address

This setting allows you to select the base I/O address for the Floppy port. The options are **Primary** and Secondary.

►DMI Event Logging

Access the submenu to make changes to the following settings.

Event Log Validity

This is a display to inform you of the event log validity. It is not a setting.

Event Log Capacity

This is a display to inform you of the event log capacity. It is not a setting.

View DMI Event Log

Highlight this item and press <Enter> to view the contents of the event log.

Event Logging

This setting allows you to **Enable** or Disable event logging.

ECC Event Logging

This setting allows you to **Enable** or Disable ECC event logging.

Mark DMI Events as Read

Highlight this item and press <Enter> to mark the DMI events as read.

Clear All DMI Event Logs

Select Yes and press <Enter> to clear all DMI event logs. The options are Yes and **No**.

► Console Redirection

Access the submenu to make changes to the following settings.

COM Port Address

This item allows you to specify which COM port to direct the remote console to: Onboard COM A or Onboard COM B. This setting can also be **Disabled**.

BAUD Rate

This item allows you to set the BAUD rate for the console redirection. The options are 300, 1200, 2400, 9600, **19.2K**, 38.4K, 57.6K, and 115.2K.

Console Type

This item allows you to choose the console redirection type. The options are VT100, VT100/8bit, PC-ANSI/7bit, **PC ANSI**, VT100+, and VT-UTF8.

Flow Control

This item allows you to set the flow control for the console redirection. The options are: None, XON/XOFF, and **CTS/RTS**.

Console Connection

This item allows you to decide how the console redirection is to be connected: either **Direct** or Via Modem.

Continue CR after POST

This item allows you to decide whether you want to continue with the console redirection after POST routines. The options are On and **Off**.

► Hardware Monitor Logic

CPU Temperature Threshold

This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The hardcode default setting is **80°C**. (The default setting for the Intel 5100 Series CPU is **75°C** and for the 5000 Series CPU is **80°C**.) (See below.)

Temperature Monitoring (Available if supported by the CPU)

This function monitors the following PECI (Platform Environment Control Interface) items:

CPU1 Temperature/CPU1 Second Core/CPU2 Temperature/CPU2 Second Core/System Temperature

Fan1-Fan6 Speeds: If the feature of Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. If the option is set to 3-pin fan, the fan speed is controlled by voltage. If the option is set to 4-pin, the fan speed will be controlled by Pulse Width Modulation (PWM). Select 3-pin if your chassis came with 3-pin fan headers. Select 4-pin if your chassis came with 4-pin fan headers. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select Disable to disable the fan speed control function to allow the onboard fans to run at full speed (12V) at all times. The Options are: **1. Disable**, **2. 3-pin (Server)**, **3. 3-pin (Workstation)**, **4. 4-pin (Server)** and **5. 4-pin (Workstation)**.

Voltage Monitoring

The following items will be monitored and displayed:

Vcore A:/Vcore B:/-12V/+12V/P1V5/+3.3V/5Vsb/5VDD/P_VTT/Vbat

Note: In the Windows OS environment, the Supero Doctor III settings take precedence over the BIOS settings. When first installed, Supero Doctor III adopts the temperature threshold settings previously set in the BIOS. Any subsequent changes to these thresholds must be made within Supero Doctor, since the SD III settings override the BIOS settings. For the Windows OS to adopt the BIOS temperature threshold settings, please change the SDIII settings to be the same as those set in the BIOS.

► IPMI (Available only when an IPMI card is installed.)

PhoenixBIOS Setup Utility		
Advanced		
IPMI		Item Specific Help
IPMI Specification Version	2.0	Enable/Disable IPMI event logging. Disabling will still log events received via the system interface.
Firmware Version	2.1	
System Event Logging	[Enabled]	
Clear System Event Log	[Disabled]	
Existing Event Log number	282	
Event Log Control		
SYS Firmware Progress	[Disabled]	
BIOS POST Errors	[Enabled]	
BIOS POST Watchdog	[Disabled]	
OS boot Watchdog	[Disabled]	
Timer for loading OS (min)	[10]	
Time out action	[No Action]	

IPMI Specification Version: This item displays the current IPMI Version.

Firmware Version: This item displays the current Firmware Version.

System Event Logging

Select Enabled to enable IPMI Event Logging. When this function is set to Disabled, the system will continue to log events received via system interface. The options are **Enabled** and Disabled.

Clear System Event Logging

Enabling this function to force the BIOS to clear the system event logs during the next cold boot. The options are Enabled and **Disabled**.

Existing Event Log Number

This item displays the number of the existing event log.

Event Log Control

System Firmware Progress

Enabling this function to log POST progress. The options are Enabled and **Disabled**.

BIOS POST Errors

Enabling this function to log POST errors. The options are Enabled and **Disabled**.

BIOS POST Watch Dog

Set to Enabled to enable POST Watch Dog. The options are Enabled and **Disabled**.

OS Boot Watch Dog

Set to Enabled to enable OS Boot Watch Dog. The options are Enabled and Disabled.

Timer for Loading OS (Minutes)

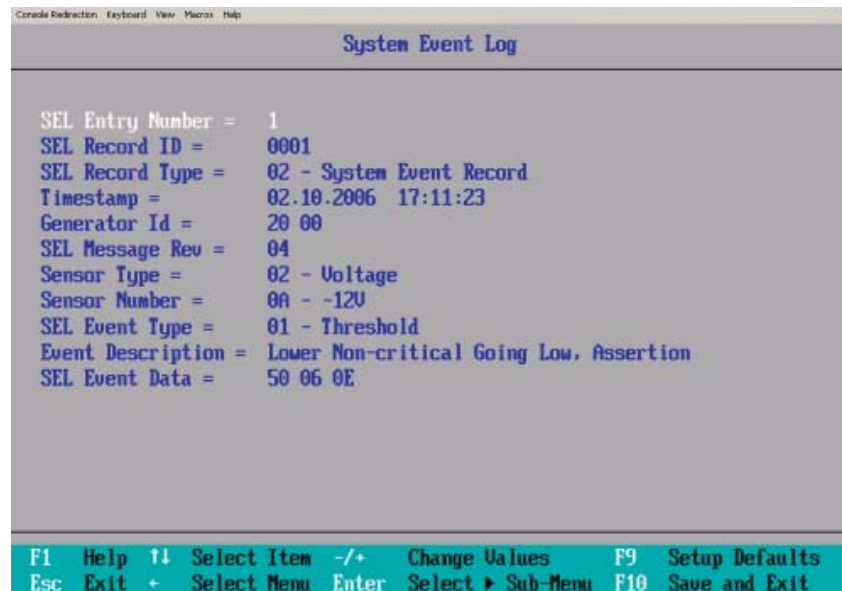
This feature allows the user to set the time value (in minutes) for the previous item: OS Boot Watch Dog by keying-in a desired number in the blank. The default setting is 10 (minutes.) (Please ignore this option when OS Boot Watch Dog is set to "Disabled".)

Time Out Option

This feature allows the user to determine what action to take in an event of a system boot failure. The options are **No Action**, Reset, Power Off and Power Cycles.

►System Event Log/System Event Log (List Mode)

These options display the System Event (SEL) Log and System Event (SEL) Log in List Mode. Items include: SEL (System Event Log) Entry Number, SEL Record ID, SEL Record Type, Time Stamp, Generator ID, SEL Message Revision, Sensor Type, Sensor Number, SEL Event Type, Event Description, and SEL Event Data.



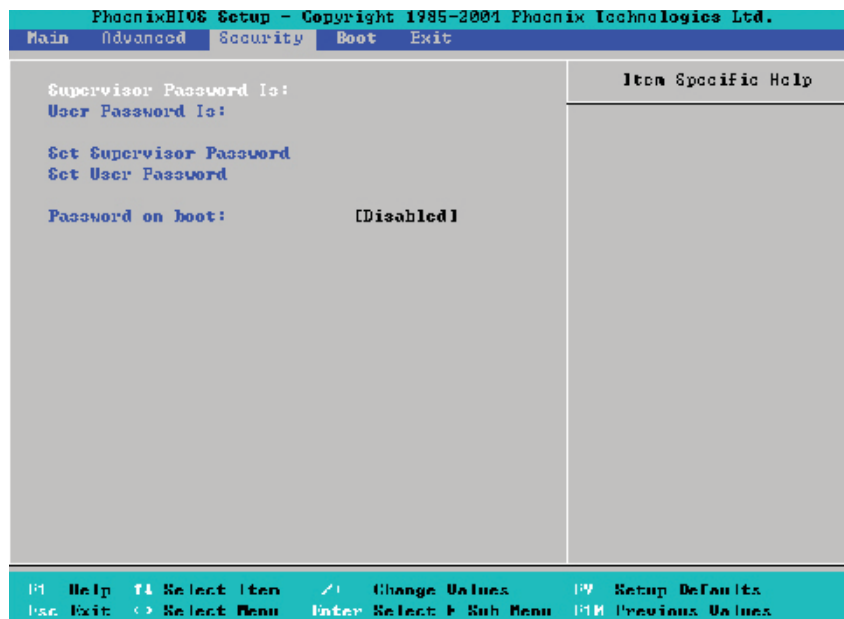
► Realtime Sensor Data

This feature display information from motherboard sensors, such as temperatures, fan speeds and voltages of various components.

Realtime Sensor Data					
Sensor Type	Sensor Name	Sensor Data	Sensor Units	Lower Limit	Upper Limit
Temp	CPU1 CoreA	48.00	degrees C	0.00	75.00
	CPU1 CoreB	54.00	degrees C	0.00	75.00
	CPU2 CoreA	47.00	degrees C	0.00	75.00
	CPU2 CoreB	46.00	degrees C	0.00	75.00
	System	44.00	degrees C	0.00	75.00
Voltage	CPU1 Core	1.13	Volts	0.97	1.47
	CPU2 Core	1.16	Volts	0.97	1.47
	3.3V	3.30	Volts	2.95	3.62
F1 Help F4 Select Item +/- Change Values F9 Setup Defaults Esc Exit + Select Menu Enter Select ► Sub-Menu F10 Save and Exit					

7-5 Security

Choose Security from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. Security setting options are displayed by highlighting the setting using the arrow keys and pressing <Enter>. All Security BIOS settings are described in this section.



Supervisor Password Is:

This indicates if a supervisor password has been entered for the system. Clear means such a password has not been used and Set means a supervisor password has been entered for the system.

User Password Is:

This indicates if a user password has been entered for the system. Clear means such a password has not been used and Set means a user password has been entered for the system.

Set Supervisor Password

When the item Set Supervisor Password is highlighted, hit the <Enter> key. When prompted, type the Supervisor's password in the dialogue box to set or to change supervisor's password, which allows access to the BIOS.

Set User Password

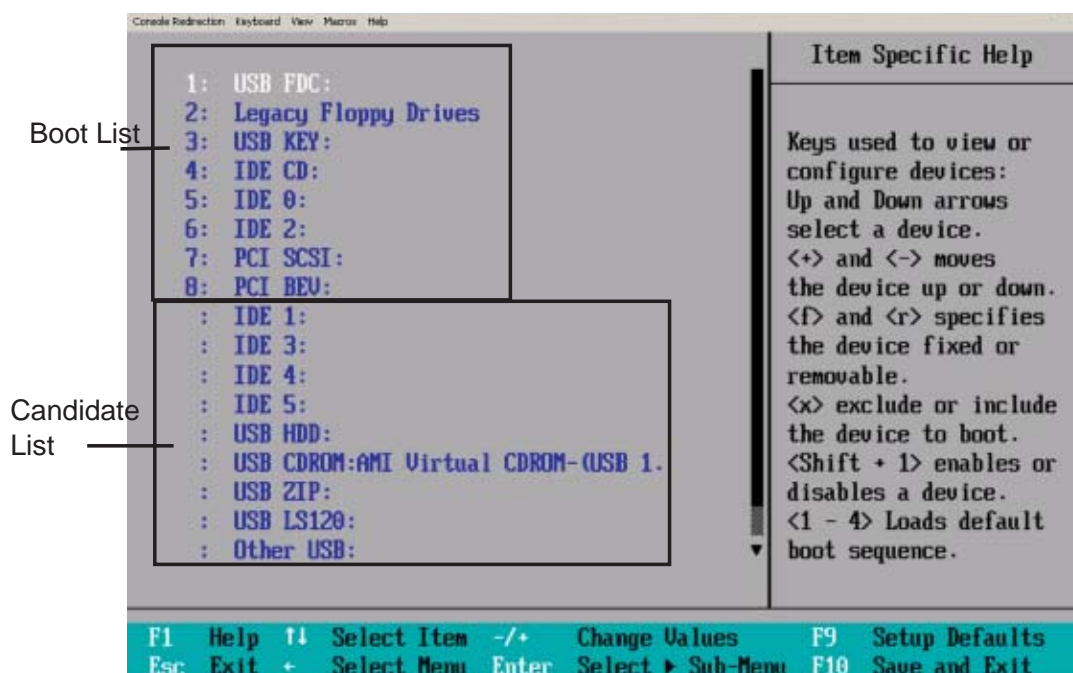
When the item Set User Password is highlighted, hit the <Enter> key. When prompted, type the user's password in the dialogue box to set or to change the user's password, which allows access to the system at boot-up.

Password on Boot

This setting allows you to determine if a password is required for a user to enter the system at bootup. The options are Enabled (password required) and **Disabled** (password not required).

7-6 Boot

Choose Boot from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. See details on how to change the order and specs of boot devices in the Item Specific Help window. All Boot BIOS settings are described in this section.

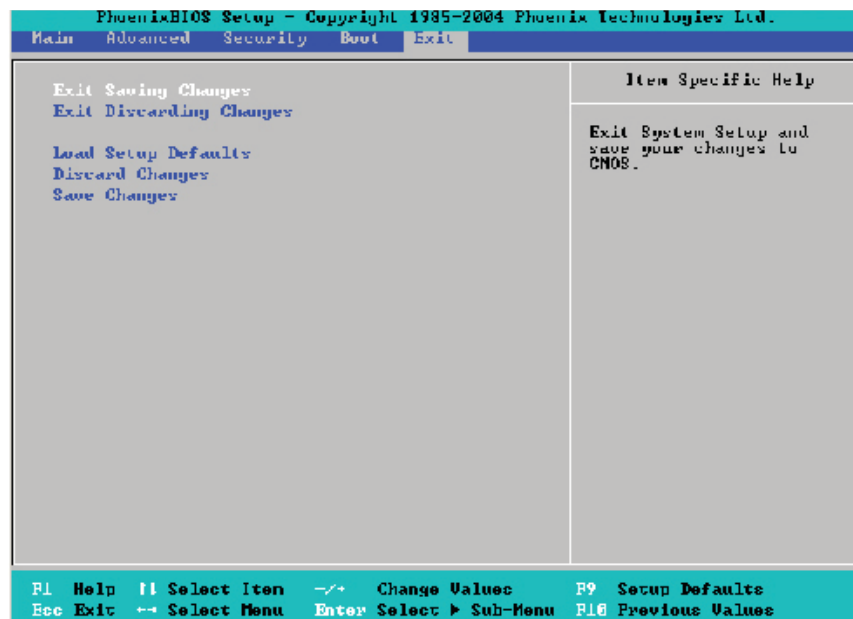


Boot Priority Order/Excluded from Boot Orders

The devices included in the boot list section (above) are bootable devices listed in the sequence of boot order as specified. The boot functions for the devices included in the candidate list (above) are currently disabled. Use a <+> key or a <-> key to move the device up or down. Use the <f> key or the <r> key to specify the type of an USB device, either fixed or removable. You can select one item from the boot list and hit the <x> key to remove it from the list of bootable devices (to make its resource available for other bootable devices). Subsequently, you can select an item from the candidate list and hit the <x> key to remove it from the candidate list and put it in the boot list. This item will then become a bootable device. See details on how to change the priority of boot order of devices in the "Item Specific Help" window.

7-7 Exit

Choose Exit from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. All Exit BIOS settings are described in this section.



Exit Saving Changes

Highlight this item and hit <Enter> to save any changes you made and to exit the BIOS Setup utility.

Exit Discarding Changes

Highlight this item and hit <Enter> to exit the BIOS Setup utility without saving any changes you may have made.

Load Setup Defaults

Highlight this item and hit <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Discard Changes

Highlight this item and hit <Enter> to discard (cancel) any changes you made. You will remain in the Setup utility.

Save Changes

Highlight this item and hit <Enter> to save any changes you made. You will remain in the Setup utility.

Appendix A

BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

Failure Fixed Disk

Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.

Stuck key

Stuck key on keyboard.

Keyboard error

Keyboard not working.

Keyboard Controller Failed

Keyboard controller failed test. May require replacing keyboard controller.

Keyboard locked - Unlock key switch

Unlock the system to proceed.

Monitor type does not match CMOS - Run SETUP

Monitor type not correctly identified in Setup

Shadow Ram Failed at offset: nnnn

Shadow RAM failed at offset **nnnn** of the 64k block at which the error was detected.

System RAM Failed at offset: nnnn

System RAM failed at offset **nnnn** of in the 64k block at which the error was detected.

Extended RAM Failed at offset: nnnn

Extended memory not working or not configured properly at offset **nnnn**.

System battery is dead - Replace and run SETUP

The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

System CMOS checksum bad - Default configuration used

System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.

System timer error

The timer test failed. Requires repair of system board.

Real time clock error

Real-Time Clock fails BIOS hardware test. May require board repair.

Check date and time settings

BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

Previous boot incomplete - Default configuration used

Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the waitstate configuration is correct. This error is cleared the next time the system is booted.

Memory Size found by POST differed from CMOS

Memory size found by POST differed from CMOS.

Diskette drive A error

Drive A: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.

Incorrect Drive A type - run SETUP

Type of floppy drive A: not correctly identified in Setup.

System cache error - Cache disabled

RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.

CPU ID:

CPU socket number for Multi-Processor error.

EISA CMOS not writeable

ServerBIOS2 test error: Cannot write to EISA CMOS.

DMA Test Failed

ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.

Software NMI Failed

ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

Fail-Safe Timer NMI Failed

ServerBIOS2 test error: Fail-Safe Timer takes too long.

device Address Conflict

Address conflict for specified **device**.

Allocation Error for: device

Run ISA or EISA Configuration Utility to resolve resource conflict for the specified **device**.

CD ROM Drive

CD ROM Drive identified.

Entering SETUP ...

Starting Setup program

Failing Bits: nnnn

The hex number **nnnn** is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.

Fixed Disk n

Fixed disk **n** (0-3) identified.

Invalid System Configuration Data

Problem with NVRAM (CMOS) data.

I/O device IRQ conflict

I/O device IRQ conflict error.

PS/2 Mouse Boot Summary Screen:

PS/2 Mouse installed.

nnnn kB Extended RAM Passed

Where **nnnn** is the amount of RAM in kilobytes successfully tested.

nnnn Cache SRAM Passed

Where **nnnn** is the amount of system cache in kilobytes successfully tested.

nnnn kB Shadow RAM Passed

Where **nnnn** is the amount of shadow RAM in kilobytes successfully tested.

nnnn kB System RAM Passed

Where **nnnn** is the amount of system RAM in kilobytes successfully tested.

One or more I2O Block Storage Devices were excluded from the Setup Boot Menu

There was not enough room in the IPL table to display all installed I2O block-storage devices.

Operating system not found

Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.

Parity Check 1 nnnn

Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.

Parity Check 2 nnnn

Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**.

Press <F1> to resume, <F2> to Setup, <F3> for previous

Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.

Press <F2> to enter Setup

Optional message displayed during POST. Can be turned off in Setup.

PS/2 Mouse:

PS/2 mouse identified.

Run the I2O Configuration Utility

One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).

System BIOS shadowed

System BIOS copied to shadow RAM.

UMB upper limit segment address: *nnnn*

Displays the address *nnnn* of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

Video BIOS shadowed

Video BIOS successfully copied to shadow RAM.

Notes

Appendix B

BIOS POST Codes

This section lists the POST (Power On Self Test) codes for the Phoenix BIOS. POST codes are divided into two categories: recoverable and terminal.

Recoverable POST Errors

When a recoverable type of error occurs during POST, the BIOS will display an POST code that describes the problem. BIOS may also issue one of the following beep codes:

- 1 long and two short beeps - video configuration error
- 1 repetitive long beep - no memory detected

Terminal POST Errors

If a terminal type of error occurs, BIOS will shut down the system. Before doing so, BIOS will write the error to port 80h, attempt to initialize video and write the error in the top left corner of the screen. The following is a list of codes that may be written to port 80h.

POST Code	Description
-----------	-------------

01h	IPMI Initialization
02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
07h	Disable shadow and execute code from the ROM.
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Reset PCI Bus Mastering devices
14h	Initialize keyboard controller
16h	1-2-2-3 BIOS ROM checksum
17h	Initialize cache before memory Auto size

POST Code Description

18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h	1-3-1-1 Test DRAM refresh
22h	1-3-1-3 Test 8742 Keyboard Controller
24h	Set ES segment register to 4 GB
28h	Auto size DRAM
29h	Initialize POST Memory Manager
2Ah	Clear 512 kB base RAM
2Ch	1-3-4-1 RAM failure on address line xxxx
2Eh	1-3-4-3 RAM failure on data bits xxxx of low byte of memory bus
2Fh	Enable cache before system BIOS shadow
32h	Test CPU bus-clock frequency
33h	Initialize Phoenix Dispatch Manager
36h	Warm start shut down
38h	Shadow system BIOS ROM
3Ah	Auto size cache
3Ch	Advanced configuration of chipset registers
3Dh	Load alternate registers with CMOS values
41h	Initialize extended memory for RomPilot (optional)
42h	Initialize interrupt vectors
45h	POST device initialization
46h	2-1-2-3 Check ROM copyright notice
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	QuietBoot start (optional)
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
4Fh	Initialize MultiBoot
50h	Display CPU type and speed
51h	Initialize EISA board (optional)
52h	Test keyboard
54h	Set key click if enabled
55h	Enable USB devices
58h	2-2-3-1 Test for unexpected interrupts
59h	Initialize POST display service
5Ah	Display prompt "Press <ESC> to enter SETUP"
5Bh	Disable CPU cache

POST Code Description

5Ch	Test RAM between 512 and 640 kB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1
66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size
6Bh	Load custom defaults (optional)
6Ch	Display shadow-area message
70h	Display error messages
72h	Check for configuration errors
76h	Check for keyboard errors
7Ch	Set up hardware interrupt vectors
7Dh	Initialize Intelligent System Monitoring (optional)
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs (optional)
81h	Late POST device initialization
82h	Detect and install external RS232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports.
87h	Configure Motherboard Configurable Devices (optional)
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2 mouse
8Ch	Initialize floppy controller
8Fh	Determine number of ATA drives (optional)
90h	Initialize hard-disk controllers
91h	Initialize local-bus hard-disk controllers
92h	Jump to UserPatch2
93h	Build MPTABLE for multi-processor boards
95h	Install CD ROM for boot
96h	Clear huge ES segment register
97h	Fix up Multi Processor table
98h	1-2 Search for option ROMs and shadow if successful. One long, two short beeps on checksum failure

POST Code Description

99h	Check for SMART Drive (optional)
9Ch	Set up Power Management
9Dh	Initialize security engine (optional)
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA and SCSI drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize typematic rate
A8h	Erase <ESC> prompt
AAh	Scan for <ESC> key stroke
ACh	Enter SETUP
A Eh	Clear Boot flag
B0h	Check for errors
B1h	Inform RomPilot about the end of POST (optional)
B2h	POST done - prepare to boot operating system
B4h	1 One short beep before boot
B5h	Terminate QuietBoot (optional)
B6h	Check password (optional)
B7h	Initialize ACPI BIOS and PPM Structures
B9h	Prepare Boot
BAh	Initialize SMBIOS
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen (optional)
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function
C4h	Initialize system error flags
C6h	Console redirection init.
C7h	Unhook INT 10h if console redirection enabled
C8h	Force check (optional)
C9h	Extended ROM checksum (optional)
CDh	Reclaim console redirection vector
D2h	Unknown interrupt
D4h	Check Intel Branding string
D8h	Alert Standard Format initialization
D9h	Late init for IPMI
DEh	Log error if micro-code not updated properly

The following are for boot block in Flash ROM

POST Code	Description
E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock
F2h	Initialize video
F3h	Initialize System Management Manager
F4h	Output one beep
F5h	Clear Huge Segment
F6h	Boot to Mini DOS
F7h	Boot to Full DOS

If the BIOS detects errors on 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (**xxxx**) indicating the address line or bits that have failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.

Notes

Appendix C

Intel HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure SATA HostRAID or SAS HostRAID before you install the Windows Operating System and other software drivers. (The LSI SAS HostRAID is available on the X7DCL-3 only.)

Important Notes

1. This chapter describes RAID configuration instructions for the Intel ICH9R Host RAID Controller designed for Windows OS. To configure the LSI SAS HostRAID, please refer to the LSI folder for the LSI SAS HostRAID Utility and documentation included on the CD-ROM that came with your system.
2. If you do not wish to configure onboard SATA or SAS RAID functions, please go directly to Section C-2 and Appendix D for the operating system & other software installation instructions.

C-1 Introduction to Serial ATA and Parallel ATA

To configure the SATA RAID functions, you must first use the Intel ICH9R SATA RAID Utility program to configure the RAID Level that you desire before installing the Windows operating system and other software drivers. The necessary drivers are all included on the Super Micro CD that came packaged with your system.

Note: the current version of the ICH9R SATA RAID Utility can only support Windows XP/2000/2003 Operating Systems.

Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface that uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link, which supports transfer rates up to 3.0 Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis. In addition, PATA cables are limited to a length of 40cm, while SATA cables can be up to one meter in length. Overall, SATA provides better functionality than PATA.

Introduction to the Intel ICH9R Serial RAID

Located in the South Bridge of the Intel 5100 chipset, the I/O Controller Hub (ICH9R) provides the I/O subsystem with access to the rest of the system. It supports 1-channel UltraATA/100 Bus Master IDE controller (PATA) and six SATA ports. The ICH9R supports the following PATA and SATA device configurations: Legacy mode and Native mode.

The Intel HostRAID Configurations

The following types of Intel's HostRAID configurations are supported:

RAID 0 (Data Striping): this writes data in parallel, interleaved ("striped") sections of two hard drives. Data transfer rate is doubled over using a single disk.

RAID1 (Data Mirroring): an identical data image from one drive is copied to another drive. The second drive must be the same size or larger than the first drive.

RAID 10 (Striping & Mirroring): RAID 0 and 1 schemes are combined (without parity information) to get the benefits of both.

RAID 5: both data and parity information are striped and mirrored across three or more hard drives.

The Intel Matrix Storage

The Intel Matrix Storage, supported by the ICH9R, allows the user to create RAID 0, RAID 1, RAID 10 and RAID 5 by using only six identical hard disk drives. The Intel Matrix Storage Technology creates two partitions on each hard disk drive, and generate a virtual RAID 0, RAID 1, RAID 10 and RAID 5 sets. It also allows you the change the HDD partition size without losing any data.

Configuring BIOS settings for SATA RAID Functions (Native Mode)

1. Press the key during system bootup to enter the BIOS Setup Utility.

Note: If it is the first time powering on the system, we recommend that you load the Optimized Default Settings. If you have already done so, please skip to Step 3.

2. Use the arrow keys to select the "Exit" Settings in the BIOS. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "Main" menu in BIOS.

4. Scroll down to "SATA Controller Mode" and press the <Enter> key to select "Enhanced"

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

6. Scroll down to "Exit". Select "Save and Exit" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

7. Once you've exited the BIOS Utility, the system will re-boot.

8. During the system bootup, press the <Ctrl> and <I> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: Press <Ctrl> <I> for the Intel RAID Configuration Utility.

Note: The Intel RAID Configuration Utility is only available for systems with two or more drives installed. The Intel RAID Utility screen will not display in systems with one drive installed.

Using the Intel ICH9R SATA RAID Utility Program

1. Creating, Deleting and Resetting RAID Volumes:

- a. After the system exits from the BIOS Setup Utility, the system will automatically reboot. The following screen appears after Power-On Self Test.

```

RAID Volumes:
None defined.

Physical Disks:
Port Drive Model      Serial #              Size   Type/Status(Vol ID)
0    WDC WD2500SD-01K  WD-HMAL72034971      232.9GB Non-RAID Disk
1    WDC WD2500SD-01K  WD-HMAL72034599      232.9GB Non-RAID Disk
2    WDC WD2500JD-00F  WD-HMAEH1376109      232.9GB Non-RAID Disk
3    WDC WD2500JD-00F  WD-HMAEH1449527      232.9GB Non-RAID Disk

Press <CTRL-I> to enter Configuration Utility...

Adaptec SCSI BIOS v4.30.0
Copyright 2003 Adaptec, Inc. All Rights Reserved.

<<< Press <Ctrl><A> for SCSISelect(TM) Utility! >>>

Slot Ch ID LUN  Vendor      Product              Size  Bus Status
-----
04  A  10  0

```

- b. When you see the above screen, press the <Ctrl> and the <I> keys simultaneously. The main menu of the SATA RAID Utility will appear.

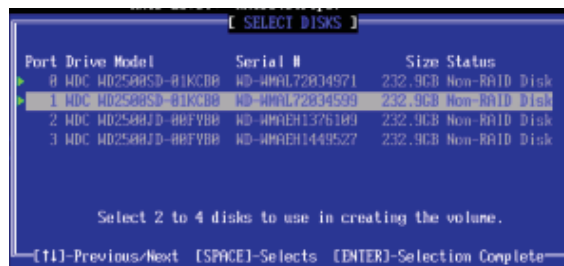
Note: All graphics and screen shots shown in the manual are for reference only. The screen shots shown in the manual do not imply Super Micro's endorsement or non-endorsement on any 3rd party's product. Your screens may or many not look exactly the same as the graphics shown in this manual.

Creating a RAID 0 Volume:

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the RAID 0 set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)
- c. When the RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select RAID 0 (Stripe) and hit <Enter>.
- d. When the Disks item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen (See the note on Page C-3) displays:



- e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.
- f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranging from 4 KB to 128 KB for the RAID 0 array, and hit <Enter>. (**Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)
- g. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- h. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 1 Volume:

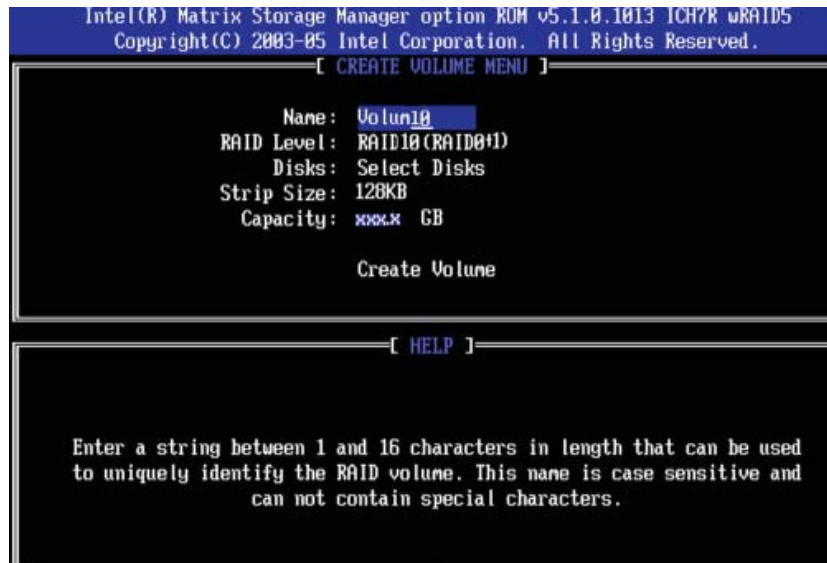
- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the RAID 1 set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)
- c. When the RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select RAID 1 (Mirror) and hit <Enter>.
- d. When the Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.
- e. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- f. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 10 (RAID 1+ RAID 0):

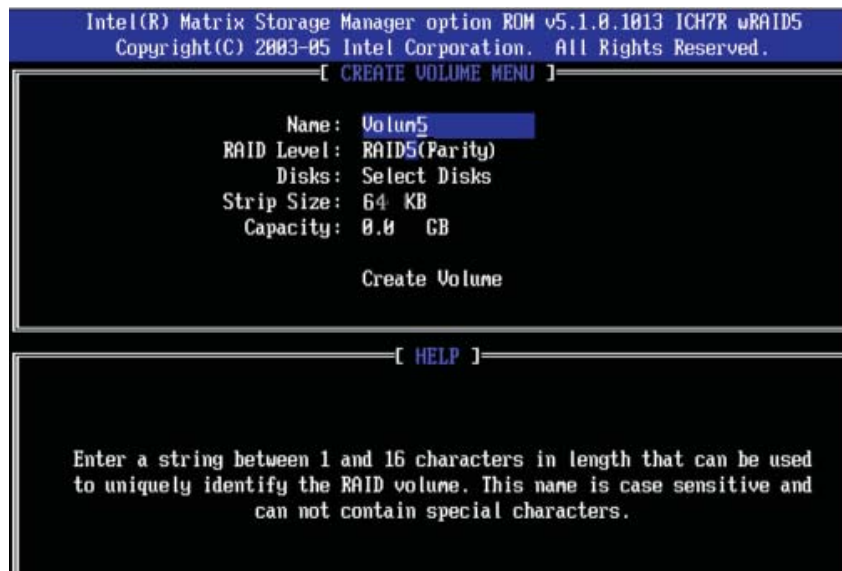
- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



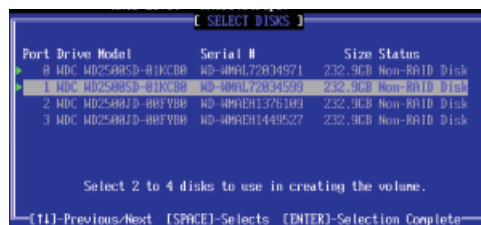
- b. Specify a name for the RAID 10 set and press <Enter>.
- c. When the RAID Level item is highlighted, use the <Up Arrow>, <Down Arrow> keys to select RAID 10 (RAID1 + RAID0) and hit <Enter>.
- d. When the Stripe Size is highlighted, use the <Up Arrow>, <Down Arrow> keys to select the stripe size from 4 KB to 128 KB for your RAID 10, and hit <Enter>. The default setting is 64 KB. (**Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size.)
- e. When the RAID Volume Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.
- f. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- g. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 5 Set (Parity):

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the RAID 5 set and press <Enter>.
- c. When the Raid Level is highlighted, use the <Up Arrow>, <Down Arrow> keys to select RAID 5 (Parity) and hit <Enter>.
- d. When the Disk item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen (See the note on Page C-3) displays:



- e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.
- f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranging from 4 KB to 128 KB for the RAID 5 array, and hit <Enter>. (**Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)
- g. Enter your desired RAID volume capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.
- h. Press Enter when the Create Volume item is highlighted. A warning message displays.
- i. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Deleting RAID Volume:



Warning: Be sure to back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

- a. From the main menu, select item2-Delete RAID Volume, and press <Enter>.
- b. Use the <Up Arrow>, <Down Arrow> keys to select the RAID set you want to delete and press . A Warning message displays.
- c. When asked "Are you sure you want to delete this volume (Y/N)", press "Y" to delete the RAID volume, or type "N" to go back to the Delete Volume menu.

Resetting to Non-RAID and Resetting a RAID HDD



Warning: Be cautious when you reset a RAID volume HDD to non-RAID or Resetting a RAID HDD. Resetting a RAID volume HDD or Resetting a RAID HDD will reformat the HDD and delete the internal RAID structure on the drive.

- a. From the main menu, select item3-Reset Disks to Non- RAID, and press <Enter>. The following screen will appear:



- b. Use the <Up Arrow>, <Down Arrow> keys to highlight the RAID set drive to reset, and press <Space> to select.
- c. Press <Enter> to reset the RAID set drive. A Warning message displays.
- d. Press "Y" to reset the drive, or type "N" to go back to the main menu.

Exiting the Intel Matrix Storage Manager Utility:

- a. From the main menu, select item4-Exit, and press <Enter>. A warning message will appear.
- b. Press "Y" to reset the drive, or type "N" to go back to the main menu.

C-2 Installing Windows XP/2000/2003 OS for RAID Functions

Installing a New Windows Operating System

1. Insert the Microsoft Windows XP/2000/2003 Setup CD in the CD Driver, and the system will start booting up from CD.
2. Press the <F6> key when the message-" Press F6 if you need to install a third party SCSI or RAID driver" displays.
3. When the Windows XP/2000/2003 Setup screen appears, press "S" to specify additional device(s).
4. Insert the driver diskette-"Intel AA RAID XP/2000/2003 Driver for ICH9R into Drive A: and press the <Enter> key.
5. Choose the Intel(R) ICH9R SATA RAID Controller from the list indicated in the XP/2000/2003 Setup Screen, and press the <Enter> key.
6. Press the <Enter> key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the <Enter> key to continue with the installation.
7. From the Windows XP/2000/2003 Setup screen, press the <Enter> key. The XP/2000/2003 Setup will automatically load all device files and then, continue the Windows XP/2000/2003 installation.
8. After the Windows XP/2000/2003 OS Installation is completed, the system will automatically reboot.

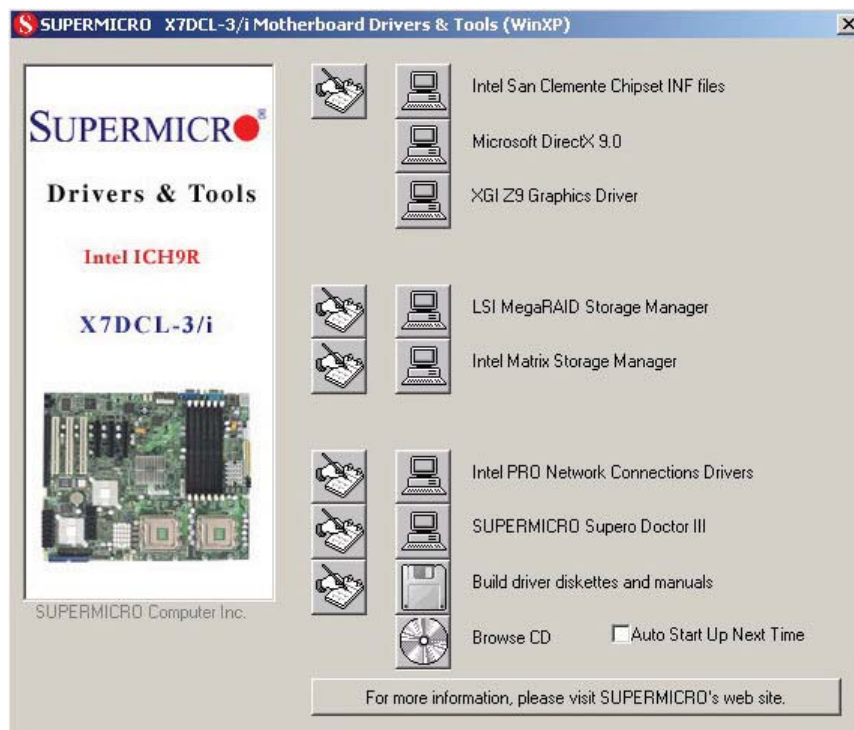
Note: the current version of the ICH9R SATA RAID Utility can only support the Windows XP/2000/2003 Operating System.

Appendix D

Software Installation

D-1 Installing Drivers

After you've installed the Windows Operating System, a screen as shown below will appear. You are ready to install software programs and drivers that have not yet been installed. To install these software programs and drivers, click the icons to the right of these items.



Driver/Tool Installation Display Screen

Notes

1. Click the icons showing a hand writing on the paper to view the readme files for each item. Click a computer icon on the right of an item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before proceeding with the next item on the list.**
2. The X7DCL-3 supports SAS RAID features. To configure the LSI SAS HostRAID, please refer to the LSI folder for the LSI SAS HostRAID Utility and documentation. The LSI folder is included in the CD-ROM that came with your system.

D-2 Configuring Supero Doctor III

The Supero Doctor III program is a Web-based management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called the SD III Client. The Supero Doctor III program included on the CDROM that came with your motherboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperatures, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

Note 1: Both default username and password are **ADMIN**.

Note 2: In the Windows OS environment, the Supero Doctor III settings take precedence over the BIOS settings. When first installed, Supero Doctor III adopts the temperature threshold settings previously set in the BIOS. Any subsequent changes to these thresholds must be made within Supero Doctor, since the SD III settings override the BIOS settings. For the Windows OS to adopt the BIOS temperature threshold settings, please change the SDIII settings to be the same as those set in the BIOS.

Supero Doctor III Interface Display Screen-I (Health Information)



Supero Doctor III Interface Display Screen-II (Remote Control)

Note: SD III Software can be downloaded from our Web site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download SDIII User's Guide at: <http://www.supermicro.com/PRODUCT/Manuals/SDIII/UserGuide.pdf>. For the Linux OS, we will still recommend that you use Supero Doctor II.

Notes

Appendix E

System Specifications

Processors

Dual Intel® Xeon 5400/5300/5200/5100 Series processors in LGA771 sockets

Note: please refer to our website for details on supported processors.

Chipset

Intel 5100 + ICH9R

BIOS

Phoenix BIOS in 8 Mb Flash EEPROM

Memory Capacity

Six (6) DIMM slots to support a maximum up to 48 GB of registered ECC DDR2-667/533 SDRAM

Note: interleaved memory requires DIMMs to be installed in pairs - refer to Section 5-6 for details.

SAS Controller (6015C-M3)

LSI 1068E SAS (Serial Attached SCSI) controller for 8-port SAS (RAID 0, 1, 10 and 5 supported)

Serial ATA Controller

Intel ICH9R on-chip controller for 6-port Serial ATA (RAID 0, 1, 5 and 10 supported)

SAS/SATA Drive Bays

Four (4) hot-swap drive bays to house four (4) standard SAS or SATA drives

Peripheral Bays

One (1) slim DVD-ROM drive

PCI Expansion

One PCI-Express x8 slot with riser card

Serverboard

6015C-M3: X7DCL-3 (ATX Form Factor)

6015C-MT: X7DCL-i (ATX Form Factor)

Dimensions (both): 12 x 10 in (305 x 254 mm)

Chassis

SC813MTQ-520C (1U Rackmount)

Dimensions: (WxHxD) 17.2 x 1.7 x 19.85 in. (437 x 43 x 504 mm)

Weight

Gross Weight: 38 lbs. (17.3 kg.)

System Cooling

Four (4) high performance 4-cm fans

System Input Requirements

AC Input Voltage: 100-240V AC auto-range

Rated Input Current: 7A-3A max

Rated Input Frequency: 50 to 60 Hz

Power Supply

Rated Output Power: 520W (Part# PWS-521-1H)

Rated Output Voltages: +3.3V (16A), +5V (20A), +12V (39A), -12V (0.5A),
+5Vsb (3A)

Operating Environment

Operating Temperature: 10° to 35° C (50° to 95° F)

Non-operating Temperature: -40° to 70° C (-40° to 158° F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions:

FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity:

EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4,
EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:

EN 60950/IEC 60950-Compliant

UL Listed (USA)

CUL Listed (Canada)

TUV Certified (Germany)

CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials:

This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate"

Note: please visit our web site for information on supported operating systems

Disclaimer (continued from front)

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